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# USSR Report

TRANSPORTATION

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## CIVIL AVIATION

### AEROFLOT OFFICIALS OUTLINE AVIATION SECTOR PROBLEMS

Moscow VOZDUSHNYY TRANSPORT in Russian 29 Jul 86 pp 1-2

[Statements by Chief Marshal of Aviation B. Bugayev and other officials of the Ministry of Civil Aviation at meeting of the ministry staff's active party membership under the rubric "With the Course of the 27th CPSU Congress": "Communists on the Lines of Reorganization and Acceleration"]

[Excerpts] Aviators in civil aviation are now in the course of reorganization, and are moving rapidly to be on the front lines in the acceleration of the country's socioeconomic development outlined by the party's 27th congress. The June (1986) Plenum of the CPSU Central Committee, which comprehensively analyzed the preliminary results and lessons of the reorganization that was established, is an important stimulus to energetic actions and the development of initiative and creativity.

A meeting of the active party membership of the Ministry of Civil Aviation staff was devoted to discussion of the decisions of the June (1986) Plenum of the CPSU Central Committee and the tasks facing aviation workers. Dissatisfaction with what has been achieved; incisive, self-critical analysis of management affairs, style and methods; and a search for new approaches to economic management and administration became the basis for statements by communists of the ministry staff.

B. Panyukov, first deputy minister of civil aviation, delivered a report at the meeting.

B. Bugayev, member of the CPSU Central Committee and minister of civil aviation; I. Mashkivskiy, chairman of the Gosavianadzor [Flight Safety of Civil Aviation Commission] attached to the USSR Council of Ministers; V. Shlykov, instructor in a CPSU Central Committee department; A. Zedginidze, deputy chief of the Politupravleniya GA [Political Administration of Civil Aviation]; deputy ministers of civil aviation; and responsible party and soviet

officials took part in the work of the meeting of the ministry staff's active party membership.

B. BUGAYEV, member of the CPSU Central Committee and minister of civil aviation, addressed the meeting. Emphasizing the sector's important contribution in accelerating the country's socioeconomic development and the successful start by aviation workers of the first year of the 12th Five-Year Plan, he devoted principal attention to the priority tasks facing civil aviators in light of the decisions of the 27th CPSU Congress and the party's Central Committee plenum and to the problems requiring energetic and immediate solution.

The fundamental task now is mobilization of all aviation workers and material and technical and power resources for unconditional fulfillment of plans, and not simply fulfillment, but intensified fulfillment, so to speak, with acceleration. We cannot achieve this goal without increased attention to social problems, to the concerns and needs of specific persons. And for this it is necessary to eradicate the armchair style of management, to get rid of the outdated faith in the power of paper, and to visit the labor collectives a little more often, to be well-informed about all the workers' requirements and interests. And to know how to protect these interests.

The human and social factor is directly linked with the sector's most important problem--increasing the safety and quality of flights. This is a complex question with a political ring. And in order to resolve it successfully, each one must become thoroughly familiar with his place and role in increasing safety and be personally responsible for it.

This concerns not only operations employees, but the sector's science as well. But it is far from justifying our hopes, and lags behind the requirements of the day. The work of the sector's scientific organizations should be subordinated to the interests of production.

In analyzing the role and influence of the communists of the ministry staff in resolving key problems in the sector's work, the party committee notes that many sections and tendencies of activity have not been affected by the process of reorganization, and the shortcomings which exist are chronic in nature and have become customary for certain communists.

Can the overall indicators of plan fulfillment really justify the fact that the fleet of aircraft, and the basic productive capital as a whole, are still far from being utilized efficiently? The volume of operations with the Il-86 is especially poor. But after all, these aircraft have the lowest proportionate fuel consumption. The fleet of helicopters is not being utilized efficiently. But aren't we really familiar with the shortcomings in air transportation? This is one of the key problems in the sector's development. And communists should resolve this more vigorously; it is necessary for V. Solomatin, Yu. Chudakov, L. Ilchuk, Yu. Nesterov and A. Andreyev to take this into account first of all. Effective steps by them directed at improving the structure of air transportation, primarily in the use of long-range mainline aircraft, should be reinforced significantly.

We must examine in a party manner what stands behind the figures, the cost with which plans are being fulfilled, and the nature of their technical basis and quality. It is well-known, for example, that aircraft operating time following repair sometimes proves to be significantly less than what is standard. The sector is incurring losses from this.

Communists of the V/O "Aviaremont" ["Aviaremont" Aviation Equipment Repair Industrial Association] V. Krivosheyev, the new chief of this association; I. Nosenko, the chief engineer; and V. Gusev and V. Morozkin, the deputy chiefs of "Aviaremont," should perceive these and other shortcomings keenly, in a party manner.

The communists of other administrations, especially A. Solovyev (GUERAT [Operation and Repair of Aviation Technical Equipment Main Administration]) and I. Razumovskiy (GUZSANT [Air and Ground Production Equipment Orders Main Administration]), who are supposed to actively influence the work of aviation repair enterprises in the performance of their official duty, must draw the proper conclusions as well.

Scientific work attending the introduction of new technology is not proceeding satisfactorily. The responsibility of managers of scientific research organizations and their relationship with production are still poor. More than 3,000 staff scientists and specialists are employed in the GosNII [State Scientific Research Institute of Civil Aviation]. However, the efficiency of their activity, especially in the area of increasing the quality of flights, is extremely low. Communist managers L. Verkhovin and N. Timofeyev, secretary of the party organization of the GlavNTU [Scientific and Technical Main Administration], must increase efficiency in work to ensure the quality of associated scientific work and the introduction of new technology.

It is well-known that an increase of 17.3 percent in passenger turnover must be provided with a limited increase (9.7 percent) in fuel supplies, that is, volume must be increased by more than one-third as much by increasing efficiency in fuel consumption. The task of reducing its proportionate consumption by 5.2 percent has been set. However, the influence of the staff's communists on solution of the problems of economy everywhere and the search for reserves is still not at the level required. Certain employees of the ministry staff still do not see their role in this important work, and sometimes they don't want to see it, either. But aren't communists of the ULS and TsUVD [Flight Service Administration and Air Traffic Central Administration] V. Potemkin, M. Bednov, V. Shelkovnikov and L. Poretskiy really responsible for seeing that the best flight conditions recommended are provided and maintained by a system of organizational and training measures?

The plenum discussed the necessity of providing incentive to persons to economize raw material and materials. But often our aviation workers, including the traffic controllers and cockpit crew which take part in economizing fuel, essentially are not being remunerated --- is this really normal? And we have the right here to require the UOTiZ [Labor Organization and Wages Administration] (the chief, communist T. Temkina, and the secretary of the party organization, A. Golubkova), together with the administrations concerned, to develop and introduce a Regulation on Providing Incentive for



Practical Economy in the shortest possible time, especially as there are suggestions from the field on these matters.

There are also many serious shortcomings in the sector's capital construction. Active party members are familiar with the nonfulfillment of capital construction plans in the previous five-year plan. And although the plan for 6 months of 1986 has been fulfilled, there are no grounds for speaking about serious improvement in the situation. A number of administrations have not coped with the limits of construction assembly completely. The number of projects under construction is decreasing slowly. The production base of the "Aviastroy" ["Aviastroy" Industrial Construction Association] has been developed poorly. Construction is being permitted in accordance with plans which do not conform to current requirements. It is necessary for Comrades Yu. Baranov, A. Voronin, L. Saratovskiy and A. Stepanov to more vigorously search for ways to resolve the problems which have accumulated in capital construction and ensure that all persons engaged in this important work have high responsibility.

Flight safety is one of the sector's central problems, which is of state importance. However, party organizations and individual communist managers of the Ministry of Civil Aviation are still not reorganizing their activity enough this year, following the party's 27th congress.

We should devote particular attention to reinforcing the discipline of aviation workers. On the whole, the sector's labor collectives, in carrying out the requirements of the April (1985) CPSU Central Committee Plenum and the party's 27th congress, have achieved positive improvements in reinforcing discipline, good organization and procedure.

At the same time, the condition of discipline in the sector is not fully responsive to current requirements and the important tasks facing aviation worker collectives. There still is no firm and consistent policy to eradicate drunkenness.

It is well-known that Aeroflot carries over 110 million passengers annually. Important national economic tasks are being carried out. Organization of this work and the quality of service is a most important production and social task. It is not being performed satisfactorily everywhere. Shortcomings in organizing flights bring about justifiable complaints from passengers and are responsible for critical statements in the press. The number of them has risen in the first 6 months.

The situation mentioned attests to serious shortcomings in this matter, to the lethargy of officials, and to the insufficient responsibility of many communists in resolving the problem of increasing the quality of passenger service.

I. VASIN, deputy minister of civil aviation, stated in his address that one of the most important and critical problems for the sector is the safety and quality of flights, particularly in conducting airborne chemical treatment operations and utilizing aircraft in the national economy.

What is the reason for the unsatisfactory state of affairs in this most important area? Command and management personnel in local groups--flight subunits, brigades and shifts--are superficial and undemanding in supervising the observance of flight rules. And what is more, the extremely dangerous conviction has shown up here and there that these rules are unjustifiably strict, and interfere with flight efficiency, they say.

It is necessary to counter such an irresponsible opinion decisively with the greatest exactingness, strict performance, and the most rigorous supervision.

What needs to be done to improve management in the operation of aviation equipment? M. SOKOLOV, senior engineer in the Operation and Repair of Aviation Technical Equipment Main Administration and deputy secretary of the party bureau, responded to this question, pointing out the necessity for more clear-cut delimitation of the functional responsibilities of the ministry's administrations, each one of which should concern itself with its own direct responsibilities without duplicating the activity of another administration.

The GUERAT collective has taken the course of improving diagnostics on aviation equipment. But there are many obstacles on this path. There is practically no scientific support for the technical operation of sectorial science. This applies to piston airplanes and helicopters in particular. It has long been time to equip "minor aircraft" with the means for objective supervision.

The problem of increasing the role of engineering and technical personnel is very critical. At the present time, 90 out of every 100 young specialists leave Aeroflot upon expiration of their 3 obligatory years of work as the result of the unsatisfactory work conditions, work quota setting and grouping by wage scales, and social conditions.

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MOTOR VEHICLES AND HIGHWAYS

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PLANS FOR MOTOR VEHICLE PRODUCTION IN 12TH FYP

Moscow AVTOMOBILNAYA PROMYSHLENNOST in Russian No 6, Jun 86 pp 1-2

[Editorial under the rubric "Implement the Decisions of the 27th CPSU Congress": "Step Up Production, Improve Quality"]

[Excerpts] An expanded session of the Collegium of the Ministry of the Automotive Industry and the Presidium of the Central Committee of the Motor Vehicle, Tractor, and Agricultural Machine Building Workers Trade Union was held, at which the tasks of sector's labor collectives for implementing the decisions of the 27th CPSU Congress were discussed. Participating in the session were administrators of enterprises and organizations and representatives from the sector's party and trade union organizations and also from other ministries and departments.

USSR Minister of the Automotive Industry V.N. Polyakov delivered a report.

At the same time, it was noted at the session that today it is already hard to be satisfied with what has been achieved. What was done earlier, including in the first months of this year, is merely a beginning of the fundamental restructuring which the party requires and which is necessary for absolute fulfillment of the set tasks. It is no secret that the rather numerous and, from the standpoint of current requirements, quite substantial shortcomings in the work of a number of enterprises and organizations have not yet been completely overcome.

Thus, although the processes of building new, more advanced motor vehicle equipment more fully meeting the needs of all sectors of the national economy for them to fulfill the intense goals of 1986 and the 12th Five-Year Plan as a whole are beginning to accelerate, they have not yet reached the necessary pace. There is a need to accelerate the development and introduction of more improved technologies, production processes, and equipment which would radically improve the quality of motor transport equipment and conserve material, energy, and labor resources. Problems related to manufacturing highly efficient tools and instruments, improving the use of fixed capital, the capital-output ratio of equipment, and machine shift coefficient are not being resolved as quickly and effectively as is necessary today. As before, the question of raising the quality of products produced is acute. For example, a number of enterprises have still not reached the level of quotas

for output of products of the highest quality category, and the products of three of the enterprises (the Kiev Motorcycle Plant, the Ivov Motor Vehicle Plant, and the Vayras Shyaulay Bicycle and Motor Plant) at one time were not even acceptable due to deviations from the requirements of design and production documentation and violations in production discipline. There are also shortcomings in the use of labor resources, certification and improvement of work positions, in the work of scientific research and planning organizations, setting up precise coordination with associated enterprises, and so forth. All these are primarily the result of certain managers of enterprises, organizations and their subdivisions, trade union committees, and also staff workers of the sector being slow to plan the need for a fundamental restructuring of the style and methods of work to the restructuring itself, or they are not doing it energetically enough. But we cannot let time get away. As was emphasized in the decision of the Collegium of Ministries and the Presidium of the Trade Union Central Committee, we must place on an even broader footing the persistent and everyday practical work, above all political and organizational work, aimed at absolute fulfillment of state plans and socialist commitments in light of the tasks set forth in the CPSU Central Committee Political Report, "Basic Directions of USSR Economic and Social Development," and increase the effectiveness of socialist emulation as the main factor in mobilizing labor collectives of motor vehicle builders to eliminate the existing shortcomings and increase the creative activity of the workers. The program document summarizing the proposals of enterprises and organizations, discussed and adopted at the expanded session of the Collegium of Ministries and the Presidium of the Trade Union Central Committee, a list of the most important measures of the sector to carry out the decisions of the 27th CPSU Congress, must become the basis of this work.

The measures enumerated in this document encompass the entire spectrum of the sector's activities and are also distinguished by specificity. They define who must do what and by what time in order to fulfill successfully the goals of the 12th Five-Year Plan. At the same time, they grant labor collectives much independence in selecting the means to achieve the set goals and provide plenty of room for initiative and socialist enterprise. They give primary attention to increasing production efficiency and the technical level and quality of output, accelerating scientific and technical progress, and improving the management mechanism. Enterprises are taking their cue from work under conditions of complex economic self-sufficiency; self-repayment in technical re-equipping; increasing savings; reinforcing labor, production, and contract discipline; and achieving a sharp improvement in all indices.

Thus, by implementing the achievements of science and technology, it is projected that the percentage of products in the highest quality category will increase sharply and nearly double. The percentage of new products corresponding to this level will also grow. The percentage of motor vehicles equipped with microprocessor systems will also increase sharply. The savings from lowering the production costs of products by increasing the technical level of production will be many hundreds of billions of rubles. Increasing the utilization factor of ferrous metal rolled stock will yield great savings.

A specific result of introducing scientific and production achievements will be the putting into production of new models of motor transport vehicles at

all plants of the sector and a manyfold increase in the amount of work for their introduction and creating an inventory of semifinished products for the 13th Five-Year Plan.

In the area of development of production there are plans to increase the average annual rate of growth of commodity production to 5.1 percent and to ensure this growth through an increase in labor productivity, the average annual rate of growth of which will be 6.8 percent; i.e., 1.6-fold higher than in the previous five-year plan. The average annual decrease in costs per ruble of production costs will also increase 2.8-fold. All this will be achieved with a decrease in the rate of consumption of materials and energy and a freeing of workers engaged in manual and unskilled labor—by replacing the operating portion of industrial-production capital, increasing the machine shift coefficient, expanding the output of products of an enterprise's own machine tool building, decreasing the specific metal content of products produced, and incorporating flexible automated systems, industrial robots and manipulators, processing centers, and automatic lines, and, of course thanks to better organization of labor and effective use of the human factor.

The listing of the most important measures calls for steps to improve the structure of motor vehicle output to make it correspond more to the demands of sectors of the national economy. In particular, to satisfy the demands of the agro-industrial complex, the production of specialized trucks will be increased; these include the KAZ, Ural, and KamAZ dumping tractor and trailer rigs, GAZ and ZIL agricultural dump trucks, refrigerator trailers for KamAZ and MAZ tractors, ARS-10 bunk feeder truck chassis, and various models and modifications of tractor trailers and semitrailers. For the mining industry, the output of 110-ton and 180-ton dump trucks is being increased, and a truck with an even greater capacity is being built. There will be new KrAZ lumber tractor trailer rigs for the lumber workers; motor transport vehicles for cold-weather use for the oil workers of the North; delivery vans for the commerce workers; new loaders for the railroad, maritime, and river transport workers, including ones with diesel engines; and the large LiAZ-5256 city bus with a diesel and a LAZ bus with a KamAZ diesel for city public transport. New front wheel drive VAZ, Moskvich, and Zaporozhets passenger cars and gas-operated trucks will hit the assembly line.

Special attention is given to developing highly economical, promising equipment and efficient consumption of all types of resources both through advanced production decisions (dieselization, developing new engines, using electronics, recovery of secondary resources, waste utilization, automation and mechanization of production processes) and through organizational measures, especially the development and improvement of the brigade form of labor organization and incentives. The listing of measures also gives a special place to the development of capacities for the production of new and modernized products, capacities for casting and forging production, as well as production preparation shops (internal machine tool building, instrument production), and scientific research and production bases, which will result in reducing the period for development and introduction of new equipment by a factor of 3 or 4.

Much is planned to be done for environmental protection (in 1986, 100-percent testing and control of motor transport equipment for toxicity and smoke was instituted, capacities for producing exhaust gas neutralization systems are being expanded, and so forth), social development (further increasing production of agricultural products, building residential houses and child-care centers, raising the qualifications of specialists, and so forth), and also for satisfying the needs of the population for goods and services. Thus, during the five-year plan the output of motorcycles will increase nearly 1.17-fold, mopeds 1.12-fold, bicycles 1.12-fold, and spare parts for cars 1.5-fold. Production of cottage motor vehicles will be set up, new passenger car trailers will be developed, and deliveries of them for sale will be increased.

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## MOTOR VEHICLES AND HIGHWAYS

### RELIABILITY, AVAILABILITY OF BURAN ATV'S FAULTED

Moscow SOVETSKAYA ROSSIYA in Russian 12 Jul 86 p 2

["Letter from the Ural Expedition to SOVETSKAYA ROSSIYA", by S. Solovyev, expedition director: "All-Terrain Vehicle in Tow"]

[Text] Usually the approach of summer never adversely affects me, but this year the higher the temperature rose, the worse my mood was. Incidentally, this happened to others on the expedition besides myself.

The packed snow over which the "Burans" made their track gradually turned into a loose pulp as the sun appeared, and the all-terrain vehicles (ATV's), unable to budge, had to be towed time and again. It was becoming more and more clear: the problem of transportation for the North was still unsolved. Geologists, reindeer breeders, oil workers, and hunters talked about this at meetings. SOVETSKAYA ROSSIYA readers also write much about this. They complain that there are still no dependable vehicles for individual operations in the tundra for the spring, fall, and summer. But vehicles are needed: by trappers to spread bait during the period between seasons; by fishermen to deliver fish to the settlement (who really knows how much of it spoils waiting for helicopters?); and by the reindeer breeders for going to the settlement for provisions, to the hospital, after the mail, for the children....

But what about the Buran ATV's? Are they really totally unsuitable, if only in the winter, which lasts quite long? Their low reliability, inefficiency, and shortage prevent widespread use of them. Deliveries of Buran ATV's must be increased greatly before we can even talk about coming close to solving the problem of transportation in the North during the winter period. The low reliability of these vehicles (I judge this not only from personal experience, but also from the large number of letters from readers of the newspaper) also affects the shortage. Some farms purchase several Buran ATV's for spare parts, since even in the event of a small breakage you cannot find parts for them anywhere. Paradoxical as it may be, such a situation is advantageous for the Andropov Motor Building Plant. Why improve the design of the ATV and work on increasing its efficiency and improving its comfortableness? The product is already in great demand. After all, the cost of the Buran ATV is considerable--2,200 rubles. Its guarantee is only for 2,000 km. Its fuel consumption is 30 liters per 100 km. Add to this the fact that the ATV constantly breaks down after low mileage.

It would not hurt the designers of the manufacturing plant to listen to those who operate their product in the North. They have not only filled the complaint "box," but also suggested many improvements. For example, the workers of the North immediately alter the exhaust pipe on the ATV and run it behind the hood. They do this so that the ice does not build up under the bottom and the exhaust fumes do not hit the driver's face during a tail wind. The State Motor Vehicle Inspection forces the owners to make a rearview mirror themselves. They also put additional shock absorber on a ski on the Buran ATV's to make the ride softer....

But the Buran ATV is an individual winter transport. As for the other times of the year, it is hard to cite a series-produced vehicle as an example. There are more than a thousand homemade ones running around the North. I remember our meetings with Aleksandr Putilin, a hunter from Nolde Bay, with his four-wheeled amphibious vehicle with an engine from a "Zaporozhets." I have yet to see a better ATV. It can carry a load of more than 400 kg. The four big tires from a "Ural," hidden away in sturdy and soft caprone covering and smoothly fitting over boulders, go through mountains and keep the vehicle afloat. I want to call this vehicle an air-vehicle. There are other designs as well. In the village of Polyarnyy, for example, geologists bought two-wheeled air-vehicles with a metal ski in front like the Buran ATV from some enterprising lads passing through for 1,100 rubles. They are not difficult to make, and they operate wonderfully! We saw how this vehicle briskly climbs a hill and goes over wet snow, where the Buran would never go. There are other variations of individual vehicles: aerosleighs, sail ice boats, boats with wheels, and even portable helicopters. In general, amateur technical ideas are not asleep, but industry is still "sleeping" and waiting for guidance from above: If it is included in the plan, they will do it; if not, that means that no one needs it. But it is needed, oh how this transportation is needed by the people in the North....

These are some of the thoughts which came to mind when we were trying for several hours to repair Volodya Rybin's snow vehicle deep in the taiga. And although the sun was shining brightly, it did not cheer us up at all.

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CSO: 1829/303



MOTOR VEHICLES AND HIGHWAYS

DIRECTOR ON IMPROVED YerAZ VEHICLE PRODUCTION

Yerevan KOMMUNIST in Russian 24 Jul 86 p 2

[Interview with V. Nersesyan, director of the Yerevan Motor Vehicle Plant, by KOMMUNIST correspondent A. Arakelyan; date and place not given]

[Text] Only recently, the Yerevan Motor Vehicle Plant (YerAZ) was among the republic's enterprises chronically lagging behind. Failure to meet planned quotas for all indices was the "norm" for the motor vehicle builders. But in the past 2 years the situation has noticeably improved. Last year and in the first 6 months of this year the YerAZ collective ensured 100-percent sale of its product taking into account the commitments for deliveries. The quality of the YerAZ-762 vans has also improved. KOMMUNIST correspondent A. Arakelyan talked with V. Nersesyan, YerAZ director, about how the motor vehicle builders have caught up, the collective's tasks and prospects for development of the plant.

[Question] At the end of the 10th and at the start of the 11th five-year plans, frequent downward adjustments in plans were typical for the plant. Nevertheless, the collective was unable to handle even the lightened quotas. The quality of your motor vehicles was also cause for serious concern. In 1982-1983 alone the plant paid 1.8 million rubles in penalties for plan failures and low product quality. However, in the past year the plant showed a profit of 6.2 million rubles. The change is striking, and it could not have happened by magic. It seems that this was the result of a large amount of organizational work done at the enterprise which moved from the quantitative to the qualitative category.

[Answer] What is the basis of the success of any enterprise? Speaking in general terms, it is relations with suppliers and production regularity. And it is precisely here that we were not up to standard for many years. Of course, now our relations with our partners are far from ideal. However, today we can say that we have achieved the main goal: suppliers consider us as equal partners, and we really sense their responsibility for our program. With the help of the USSR Ministry of the Automotive Industry we have tried to see that our suppliers, and there are about 300 of them, fulfill their

commitments 15-20 days ahead of schedule. This makes it possible to create a reliable reserve at the plant for fulfilling the plan.

It is easy to talk about established relations with partners. But how were these relations set up? Quarterly we clarify the planned commitments with them and regularly exchange information on production rhythm with them. At the end of last year we convened a conference of our suppliers and consumers, where we discussed mutual obligations. I must note that this meeting was mutually beneficial.

At the same time, I would also like to direct your attention to a number of problems which if resolved would enable us to improve production considerably. In determining suppliers of metal products, we see it advisable to take into account their regional location in order to avoid inefficient shipments. Let us say we receive roll-formed section from Komsomolsk-na-Amure. The shipping distance is reflected in production regularity, and the standard for metal reserve increases, which hurts the plants economic indicators. At the 27th CPSU Congress they raised the question of going from a quarterly to monthly planning of deliveries. We agree completely. This will give greater dynamism to production, will ensure its regularity as well as timely shipment of our product to the customer, and will make our relations with the railroad more flexible and reliable.

Relations with suppliers are an important condition production regularity. As I already noted, we have pretty good relations. However, regularity depends to a greater extent on the specific collective. In the not too distant past, shock work flourished at the YerAZ, and the end of the accounting period accounted for the lion's share of finished products. Today we can say that the situation has changed.

We are sometimes asked how we achieved complete regularity? There are no secrets. We simply tackled the problem in the right way. We set up strict monitoring of daily quota fulfillment, improved production organization, began to use the capacities more efficiently, completely put our resources into effect, and I already mentioned the deliveries.

[Question] It often happens that more emphasis is placed on production volume rather than on product quality. This, in turn, leads not only to economic losses but also moral losses. Until recently, YerAZ motor vehicles had a bad reputation as being unreliable in operation. True, the situation is being corrected, however, the YerAZ-762 model itself is clearly obsolete. Work is being done at the plant to set up series production of the new YerAZ-3739 model, which conforms to today's technical level and the requirements of standards in effect. But as was noted at the 28th Armenian Communist Party Congress, the plant is not stepping up the deadlines for series production of new model vans. As you know, the enterprise is going over to the new model completely by 1989.

[Answer] For us, product quality is the number one task, and much is being done in this direction. Statistics show that whereas in 1985 the plant had 14 claims amounting to 47,000 rubles, during the first 6 months of this year we have had 2 for 6,000 rubles. This does not mean that we are satisfied with

the quality of our vehicles. The outdated model being produced has been certified for category one. In the next 2-3 years, as we gradually set up production of the new model, we will take the old one out of production.

We are working in many directions to improve quality. Eliminating "weak" points, let's say, makes it possible not only to ensure production regularity, but also to improve product quality considerably. For example, one "weak" point on which the fate of the entire plant's plan depended was the forging shop, where virtually all parts are manufactured. Here the problems were of a purely organizational nature: personnel, lack of highly qualified workers and engineers, poor organization of production. We started by selecting a competent shop chief who liked his work, found ways to increase the professional skills of workers and engineers, and set up an effective system of dispatching and planning. Having solved the personnel problems, we also solved the problem of putting the shop's capacities in operation, and eliminated profitable and unprofitable operations.

We made a major overhaul of existing equipment throughout the plant, thanks to which the technical condition of the equipment park improved. We are also steadily replacing obsolete assemblies and have put a new paint shop in operation. The percentage of manual labor at the plant is 26.1 percent instead of the 26.8 according to the plan.

But, of course, we consider the main reserve to be the human element, people's attitude toward the job. The discipline and responsibility of every worker at all levels have increased. Here the administration and the party organization have been working in several directions: morale and material incentives, fines, training, selection and placement of personnel. The role and importance of the technical control division (OTK) and controllers' concern for product quality have risen sharply. Self-supporting brigades are working in the main shops.

Some believe that the increase in discipline has played a decisive role in improving quality. I would state this somewhat differently. The increase in discipline was the result of workers' awareness of the concept of "trademark honor." People got tired of being the object of criticism; they want to take pride in saying "I'm from YerAZ." The better they work, the more they get paid. Hence, the decrease in labor turnover: whereas 5 years ago it was 33 percent, in the first 6 months of this year it was 15.6 percent.

Now, about the new van model. There have been a lot of problems with it on our part. I do not want to talk about objective reasons, but much depends on us. Not only the administration but also the party committee have examined the questions of improving the designs of individual components, manufacturing preparation, and coordination between the services engaged in preparing series production of the new vans. They have examined them, but have not exercised sufficient supervision. Today the deadlines are being strictly monitored. There is reason to believe that the new model will begin series production in 1987, as called for.

[Question] Beginning this year the plant is operating under new conditions of economic operation. Naturally it is too early to talk about end results, but

one can make some intermediate conclusions according to the results of the past 6 months. In particular, how does the situation seem to you where industrial enterprises are granted greater independence in distribution of profits, setting up direct contacts with suppliers, and in developing and planning prospective types of products?

[Answer] According to the results of the first 6 months, the plant exceeded all the basic technical and economic indicators and produced dozens of vans over and above the plan. In the first quarter we were in prize-ranking in socialist competition of the USSR Ministry of the Automotive Industry. The favorable results could be associated with the new method of economic operation, but, as they say, it is too early to talk about the advantages of the method, but the shortcomings are obvious.

Enterprises were given greater independence, but in reality it is not felt very much. For example, the temporary norms for calculating the fund for production development were not brought to the standard. Let us say YerAZ's expected profit this year will be more than 7 million rubles, and we will add another 2 million of amortization allowances. Of this sum we have the right to use for the plant's needs, for retooling in particular, only about 300,000 rubles, which is clearly insufficient for our enterprise. Also insufficient is the standard for set contributions to the state budget to finance social insurance benefits in addition to the base. The existing standard does not provide for the planned increase in output in real terms. Without a doubt, here it is necessary to take into account the specifics of each enterprise, which, in my opinion, are best known by the people running the plant. The standards for extra charges for the economic incentive fund are also low.

In short, we do not have the right independently to use a single ruble as we see fit. But enterprises making a mess of the plan from one year to the next exist on the profit of the leading collectives, ending up behind the neighbor's back as it were. This faulty practice was also talked about at the 27th CPSU Congress.

The independence of enterprises must not be limited merely to finances. It seems advisable to us to expand the rights of direct agreements with organizations in order to accelerate the introduction of scientific and technical achievements. I will explain the idea. Say, we need new construction materials. But we do not have funds for them. Why not authorize us to purchase them from a specific enterprise if the latter sells us only products which are in excess of the plan?

Now the time for introducing a new product is approximately 2 years: designs must be drawn up, standards established, funds for materials obtained, and only then can we get on with introducing the product. We have experience in introducing a new product as quickly as possible. The residents and visitors to Yerevan are familiar with the attractive mobile shops in the trade system. The idea for them originated in the Yerevan Party Gorkom. And we needed only 1 month from concept to introduction. We made the vehicles without specifications or a set price. Twenty mobile shops are experimental, and in the course of their operation they are being refined and improved. It has

been 3 months since they were made, and only now are the blueprints being prepared. This kind of approach is what independence is all about.

There are quite a few problems facing the YerAZ. We are at the start of a long journey. However, I express the opinion of the entire collective when I say that, having overcome the lagging behind, we are firmly resolved to be on the leading edge of domestic motor vehicle building in the future.

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MOTOR VEHICLES AND HIGHWAYS

MORE OFFICIAL COMMENTARY ON CONTINUING TIRE SHORTAGES

Moscow ZA RULEM in Russian No 7, Jul 86 pp 6-7

[Article: "How Does One Travel Without Tires?"]

[Text] This was the title of an article which was published in the magazine (No 11, 1985) concerning the shortage of tires for passenger automobiles and its causes. The Ministry of the Petroleum Refining and Petrochemical Industry reply to it has already been published (No 4, 1986). It reported that the industry is providing approximately a million tire casings above the previously planned nine million this year. Is that enough, however, to eliminate the "three-year-long" line about which the magazine wrote? The USSR Gosplan examined this question during a joint meeting with representatives of the interested organizations.

We are publishing the reply of M. G. Yesenkov, deputy chief of the Chemical Industry Department of the USSR Gosplan, which analyzes the abnormal situation that has taken shape during recent years in the tire-casing trade and reports on the measures being taken.

"Passenger car tire delivery volumes were determined in accordance with the market funds in the 11th Five-Year Plan based on requisitions from the USSR Ministry of Trade. Considering the fact that difficulties have appeared since 1983 in supplying the population with tires, the Chemical Industry Department and the USSR Ministry of the Petroleum Refining and Petrochemical Industry took steps to increase sharply the delivery volumes of tires to the market. Thus, market assets were increased by 2.7 million tires in 1984-1985 as opposed to the targets of the five-year plan and by 0.9 million tires in 1986 as opposed to the 1985 plan.

"The steps that have been taken, however, have not permitted the situation with respect to the supplying of the population with tires to be stabilized. In the opinion of the Chemical Industry Department, the rational distribution of tires to the country's regions considering road and climate conditions, the actual availability of the motor vehicle pool and the amount of tire casing reconditioning are acquiring a great deal of importance in this situation. As an analysis of USSR Ministry of Trade and RSFSR Ministry of Trade data on the distribution of tires to the union republics and to RSFSR oblasts has shown, this principle is not always being observed. This can be confirmed by the following example.

"Based on the actual distribution of tires by the USSR Ministry of Trade in 1986, the indicator entitled "The number of tires allotted per automobile", which describes the tire requirement level of satisfaction, was: 1.73 for the Georgian SSR, 1.67 for the Azerbaijan SSR, 1.79 for the Armenian SSR, and 1.27 for the Estonian SSR at a time when it was 0.71 for the RSFSR, 0.78 for the Belorussian SSR and 0.82 for the Kazakh SSR and 0.87 for the country as a whole. During 1986, the USSR Ministry of Trade sent more than 41 percent of the increase in market assets -- this was 900,000 tires -- to the Georgian SSR, Azerbaijan SSR, Armenian SSR, and Estonian SSR when the automobile pool in these republics was 7.3 percent of the total pool. In connection with this, it has been suggested that the USSR Ministry of Trade make the appropriate adjustment in the plan for distribution to the republics during 1986. Beginning in 1987, the Chemical Industry Department will monitor the distribution of passenger car tires to the republics.

"In order to improve the supplying of the population with tires during 1986, the Chemical Industry Department and the USSR Gosnab and USSR Ministry of the Petroleum Refining and Petrochemical Industry will examine the question of an additional allotment of 150,000-200,000 tires for sale based on the results of the 1 January 1986 census of the remaining material assets.

"At the present time, the USSR Ministry of the Petroleum Refining and Petrochemical Industry is preparing proposals to increase production capacities for producing tires for passenger cars and for their delivery to market assets during 1987-1990."

G. I. Vashchenko, USSR minister of trade, has reviewed the article "How Does One Travel Without Tires?" We are publishing a somewhat condensed version of his reply. This was done without damaging the content.

"During recent years, the USSR Ministry of Trade has been allocated 1.0-1.5 million automobile tires less than the requirement. Although 900,000 automobile tire casings more will be delivered during 1986 than during last year, this, unfortunately, will not permit the need of all those needing them to be satisfied.

"During the current year, it is necessary to allocate no fewer than an additional two million tire casings (the requisition was for 11.8 million tires and 9.9 million were allocated) to the market. The USSR Ministry of Trade has been compelled to set norms for their sale because of the complicated tire trading conditions, cancelling the primary sale of passenger tires to the members of voluntary societies for motorists. At the present time, the ispolkoms of local councils of people's deputies and their bodies for managing trade have determined the stores in which automobile tires will be sold in accordance with the prior registering of the population; and the number of tire casings and the spacing of their sale to one automobile owner are being established in strict accordance with the actual need for them. In this regard, a mandatory notation of the date and the number of tires acquired is made in the automobile's technical certificate.

"Concerning the procedure for distributing automobile tires to the union republics, the conditions of their operation are also being taken into account along with the pool of passenger cars -- the average annual distance travelled, the natural and climatic features, and the condition of the road network-- because the difference in these conditions causes a need to distribute automobile tires differently in the country as opposed to the average supply level.

"The USSR Ministry of Trade thinks that the procedure, which has been established by the USSR Ministry of the Petroleum Refining and Petrochemical Industry for the replacement of poor quality automobile tires by their owners mailing them to the manufacturing plants is inconvenient for the purchasers. It would be more correct for the tire manufacturing plants to establish warranty points in the oblasts based at the population's consumer services enterprises or the servicing stations for passenger cars belonging to the citizens.

"On its part, the ministry is taking additional steps to improve control over the quality of the automobile tires that are being shipped for sale to the population."

The editor's comments. As is seen from the replies quoted here, the USSR Gosplan and the USSR Ministry of Trade admit that insufficient tires were produced for passenger cars during the 11th Five-Year Plan. The planning bodies determined the quota for the industry during the 12th Five-Year Plan considering this. It is quite evident, however, that the shortage of automobile tire casing still exists to some degree or other. As is pointed out in the USSR Gosplan reply, it is particularly important under these conditions to distribute the items, which are being produced by the tire manufacturers, correctly.

Indeed, it seems unjustified that Georgia, Armenia and Azerbaijan annually received during the last five-year plan and during the current year on the average twofold-threefold more tire casings per automobile than did the RSFSR, Kazakhstan and other republics. According to the existing regulations, the running norm for tires on the roads of these republics is only 17 percent less than in the central zone of Russia. Even if an amendment is made for the large average annual distance travelled by automobiles in the country's south (and this indicator has not been documented anywhere), the threefold requirement for scarce tire casings by Georgia, Armenia and Azerbaijan in comparison with the other republics can hardly be explained by this. In any event, the USSR Ministry of Trade workers were not able to provide a convincing explanation for this. Their reasoning does not stand up to criticism if only because Estonia, which now receives twofold more tires per automobile than Russia or, for example, Lithuanian and Latvia, was added in 1986 to the number of republics that were privileged in receiving tires. Thus, the question of the correct distribution of this scarce product remains open.

The suggestions by the USSR Gosplan's Chemical Industry Department about introducing adjustments in the proposed amounts of tire deliveries to the union republics during this year are completely justified. Judging from the



fact that nothing was said about this in the Ministry of Trade's reply that was received by the editors, however, they do not plan to work on this problem there. How, nevertheless, is it necessary to assume on themselves the trouble of replacing the factory rejects, having placed it completely on the purchaser? True, the USSR minister of trade admits in his reply that this is incorrect, but what will be done specifically to change the existing situation?

In our view, the main trouble in supplying tires occurs because there are too many departments and organizations now engaged in this matter. Some produce them, others distribute them, still others collect worn casings and still other recondition them.... Generally speaking, no one has responsibility to the purchaser of tires. Moreover, in general, interest in tires disappears when the talk turns to responsibility.

The directors of Rostransekspeditsiya [probably RSFSR Ministry of Trade Transportation and Forwarding Service] (the organization which should insure the collection of casings for reconditioning) have informed the editors that, in their opinion, "with the availability at the present time of a network for receiving tires for VDOAM [expansion unknown] repairs, it is advisable to organize this work simultaneously in the enterprises of the population's transport forwarding service." Not a single department is now engaged in such an important task as the repair of tires with small damages and the collection of tire casings, which are not worth reconditioning, from the population for reprocessing.

When thinking about how many departments are hurrying to spare themselves the trouble with tires for passenger cars, you inevitably come to the thought that one organization should be engaged in the supplying of motorists with high quality tire casings and services for their repair, restoration and collection for reprocessing. This has been done, for example, in the GDR from where we have also received replies to the magazine's article. Their motorists only deal with specialized enterprises and workshops where new and reconditioned tire casings are sold and old ones as well as those, which need reclamation, are received. Moreover, it turns out to be very beneficial to be engaged in this work-- the state receives a profit and the purchaser -- tires. Practically all of the secondary raw material, which is obtained from using the millions of casings, is involved in production -- and no one asks the question, "How does one travel without tires?" there.

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MOTOR VEHICLES AND HIGHWAYS

GOSPLAN SUPPORTING TRUCK TRANSPORT EXPERIMENT EXPANSION

Moscow IZVESTIYA in Russian 8 Aug 86 p 2

[Editorial: "The Experiment Receives Support: 'Motor Transport at the Crossroads' [No 154]." For a translation of the article to which this item refers, see JPRS-UTR-86-016, 14 August 1986, pages 27-32]

[Text] The RSFSR Gosplan reviewed this article, and Deputy Chairman D. Dudnev reported to the editorial staff. The article correctly stated problems concerning the need to expand in the RSFSR Ministry of Motor Transport the experiment on paying drivers by incorporating the "paid truck-ton-hour" index into planning.

Visits by RSFSR Gosplan workers to a number of motor transport enterprises involved in the experiment confirmed that these enterprises lack conditions for recording tons and kilometers, a balance of profitability in shipments is maintained, fuel consumption has been reduced, and discipline in the collectives has improved.

Chief of the transport department of the USSR Gosplan, D. Zotov, reported that the USSR State Committee for Labor and Social Problems, the USSR Ministry of Finance, and the USSR Gosplan, having reviewed the article, submitted a proposal to the USSR Council of Ministers to expand this experiment in the national economy and establish the "paid truck-ton-hour" index for planning and evaluating the economic activities of motor transport enterprises. Presently a draft decision is being prepared on this matter. In so doing, the attention of the ministries and departments is being directed to the need to ensure a correct correlation between the growth of average wage and the growth in labor productivity in motor transport, and also to increasing the responsibility of consigners and consignees for idle time of motor vehicles over and above the norm.

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## MOTOR VEHICLES AND HIGHWAYS

### BRIEFS

**GAZ-3403 TRACKED ATV PRODUCTION--Gorkiy--**The new model GAZ-3403 tracked all-terrain vehicle (ATV) has been put in production at the Volga Tracked Tractor Plant. The first batch of vehicles has already been sent to the geologists and builders of gas pipelines in northern regions of the country. This year the enterprise will produce several dozen of these ATV's. Specialists of the Gorkiy Motor Vehicle Plant have developed a new model. The chief of the plant's tracked vehicle design office, V. Rogozhin, says that this vehicle differs substantially from those produced earlier. It has greater cross-country capability, which makes it possible to negotiate with ease deep snow and swamps, and even to cross rivers. Quite a few improvements have been made, particularly to the tracked propelling device. Its service life has increased from 5,000 to 12,000 km. In addition, the tractor's top speed has been increased to 60 km per hour. The load capacity is 1.25 tons, and the vehicle is capable of handling 10 passengers accommodated in a heated compartment. Industrial production of the new tractors at the Volga Plant was set up in production areas partially modernized. Thus, highly productive numerical-control machine tools have appeared in the machining shops. [By A. Yershov, IZVESTIYA correspondent] [Text] [Moscow IZVESTIYA in Russian 9 Aug 86 p 1] 12567

**MAYKOP LNG FILLING STATION--Krasnodar--**The other day an automated gas-filling compressor station became operational in Maykop. It is designed for servicing motor vehicles and provides up to 500 refuelings a day. Today several thousand motor vehicles in the Kuban are operating on natural gas instead of gasoline. Primarily urban transport is being converted to the new fuel. This makes it possible to save thousands of tons of liquid fuel each year and to ensure ecologically clean operation of engines, since water vapor instead of toxic compounds are emitted through the exhaust pipe when using gas. [By Yu. Semenenko] [Text] [Moscow SELSKAYA ZHIZN in Russian 30 Jul 86 p 4] 12567

**DIESEL-TROLLEY TRUCK TESTED**—Rudnyy, Kustanay Oblast—26 Aug 86—The first section of a diesel-trolley truck has been tested at the Kurzhunkulskiy Mine of the Sokolovsko-Sarbayaskiy Ore Enrichment Production Association. The dumptruck was made on the base of a 75-ton BelAZ truck. It is powered by a diesel engine during descent into the open pit, and runs on electrical power during ascent. In the next few days a second trolley truck made at a motor vehicle plant in the city of Zhodino will come on line. [By PRAVDA correspondent Ye. Zaytsev] [Text] [Moscow PRAVDA in Russian 27 Aug 86 p 2] 12567

**MORE DNIEPER BRIDGES PLANNED**—Kiev—In the future three more bridges will be added to those in operation today across the Dnieper. Construction of one of them has already begun under a project of the associates of the Kiev branch office of the Soyuzdorproyekt Institute in the city of Dneprodzerzhinsk. In 1993 it will link the industrial zone located in the right-bank portion of the city with the new construction projects of the residential microregions on the left bank, where by the year 2000 about 300,000 people will live--the population of Dneprodzerzhinsk today. "The new bridge passage, about 8.5 km long (at a cost of over 90 million rubles), will make it possible to cut in one-half or one-third the travel time to work and back for tens of thousands of citizens," says the project's chief engineer, Yu. Shapiro. "The planned six lanes of motor transport traffic and streetcar line will ensure dependable passenger service. In short, the new passage will be 1.5-fold wider than the well-known Paton Bridge in the Ukrainian capital. In all, it will include two bridges across the Dnieper, one 850 meters long (across the nonnavigable branch) and one 720 meters long (across the navigable branch), and also five overpasses and trestle bridges. The two 126-meter navigation spans will ensure unimpeded movement of modern passenger and cargo ships. In the future the Kiev specialists will begin a feasibility study for another bridge passage across the Dnieper. [By V. Nikipelov] [Text] [Moscow IZVESTIYA in Russian 28 Aug 86 p 1] 12567

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## RAIL SYSTEMS

### CHIEF DETAILS BELORUSSIAN RAILROAD EXPERIMENT

Moscow PLANOVYE KHOZYAYSTVO in Russian No 8, Aug 86 pp 22-28

[Article by A. Andreyev, chief of the Belorussian Railroad (Order of Lenin), Hero of Socialist Labor; and V. Ozhegov, chief of the railroad's economic planning division: "The Experiment on the Belorussian Railroad"; passages enclosed in slant lines printed in boldface.]

[Text] It was noted in the Political Report of the CPSU Central Committee to the 27th CPSU Party Congress: "...The railroad workers of Belorussia, having converted to a new system of wages and combination of duties, released about 12,000 workers for other sectors in a short period of time."<sup>1</sup>

The program for this broad-scale experiment calls for improvement in the economic mechanism, an increase in the material interests of each worker and the strengthening of economic accountability of collectives for achieving high final results. The basic stages in the experiment and the experience of the railroad's collective have been used by the Ministry of Railroads to develop a program for incorporating the Belorussian Railroad's experience over the country's entire network of railroads during 1986-1988.

The Belorussian Railroad is one of 32 mainlines in the country; it provides for the needs not only of the national economy and the people of the Belorussian SSR for rail transportation, but a significant volume of transit shipments as well, connecting with the Baltic States, Leningrad and Kaliningrad oblasts with other regions of the country, primarily the Ukraine and Moldavia, and it carries a large volume of export-import traffic.

The railroad is comprised of more than 100 large enterprises, territorially separated but joined by technology; it was necessary to direct their collectives toward the resolution of a set of problems, the ultimate goal of which was to achieve a sharp increase in labor productivity and, increase the wages of the railroad workers by releasing internal railroad funds without state subsidy. Groundwork was laid for the experiment by previous, multi-faceted and intense work to strengthen the technical equipment of the railroad's multibranch economy, improving equipment, incorporation of computers to control the

<sup>1</sup>Materials of the 27th Congress of the Communist Party of the Soviet Union, Moscow, Politizdat, 1986, p. 42.

transporting process, and by a careful study and propagation of everything new that appeared among the leading collectives of ours and the country's other railroads.

During the past 10 years, the production and technical potential of the railroad's enterprises, their fixed capital has increased. More than 70 enterprises and shops were constructed, renovated, expanded or reoutfitted just during the last five-year plan. The level of mechanization grew considerably at enterprises of all services, primarily at the most labor-intensive ones: it exceeded 95 percent for loading and unloading operations, 87.2 percent for major overhaul of track and reached 78.3 percent for intermediate maintenance. Track straightening is almost fully mechanized, and manual labor costs for replacement of switches with timbers, smoothing the track and many other operations have been reduced sharply. About one-third of the total emancipation of workers was realized due to the incorporation of the achievements of scientific and technical progress, and more than 50 percent due to improvements in the organization of labor on this basis.

The successful realization of a social program also facilitated the experiment. The active participation of labor collectives from the railroad's divisions and the many enterprises to meet the building program permitted us to overfulfill plans for putting living space, kindergartens and nurseries and domestic facilities. All of the railroad's divisions except the Baranovich, have their own dispensary-sanatoriums, and most of the units are well provided with kindergartens and nurseries; more than 20,000 square meters of living space were made available during the 11th Five-Year Plan alone. The collective still faces a great social program during the current five-year plan.

However, the MPS [Ministry of Railroads], the railroad's command component and the leading workers were alarmed by the discrepancy between the growth rates for fixed capital and labor productivity. There is certainly an objective explanation to this process: the change in the nature of rail car flow, a decline in the growth rate of shipping volume with a simultaneous growth in the share, features of rolling stock repair in connection with a significant deterioration in its technical state. However, the requirement of the time, to uniformly improve quality and efficiency of transportation and to provide a high labor productivity growth rate, compelled us to examine the situation which had developed with care and to uncover the causes for the decline in the labor productivity growth rate. The critical nature of these problems was determined by decisions of the April (1985) Plenum of the CPSU Central Committee.

To accelerate the labor productivity growth rate, it was necessary to change the organization of production and labor, and a stricter approach to measures for increasing the technical and technological level of production and for improving the structure of management, organization and establishment of labor standards.

Much was also done with regard to equipping grade crossings: 383 crossings were equipped with automatic signaling, equipment was improved at 102, reinforced concrete decking was installed at 360, and 480 crossings were given major repair. At 620 crossings, visibility was improved on the approaches by cutting down trees and bushes, tearing down certain structures, widening cuts and changing the profile of highways.

To some extent, a railroad crossing can be compared with a street intersection, where traffic is regulated by stoplights, irregardless of the traffic volume. Why not legalize this principle at crossings after having re-equipped them appropriately? It would require that existing regulations be changed and much familiarization be carried out.

In association with the experiment which has been noted, the railroad in 1984 obtained official permission of the MPS to remove the guards from a number of crossings. This was preceded by a thorough study, as a result of which concrete measures were planned which would insure traffic safety, and only after these had been carried out was the guard removed.

The automatic signaling devices were monitored for proper working order by the duty personnel at the nearest station or by the dispatcher on sectors where dispatcher facilities have been centralized. Carrying out these measures permitted us to change 390 crossings to unguarded and to free up 1276 persons in 1984-1985. This year, this work is continuing, and the guard will be removed from 37 more crossings, which will free up at least an additional 130 persons.

Combining the duties of fireman [assistant engineer] and yard master into a single worker is not a new undertaking. This has been approved by MPS for shunting operations and for export and transfer traffic. The following conditions had to be met to combine the duties of shunting locomotive engineer and yard master:

equip all switch engines with devices which make it possible for the engineer to disconnect the locomotive from the train directly from the cabin without the yard master's assistance;

provide radio communications between the engineer and the yard master; and

organize the work so that having the duties performed by a single worker would not slow down shunting operations, but still insure full traffic safety.

Converting to the aforementioned [way of] working required significant preparation, primarily a reexamination of the regulation in effect by which operation of a train by an engineer without the aid of a fireman is permitted on sectors with little activity (with traffic up to 8 pair of trains per day). At our request, and with permission of MPS, the definition of a sector with little activity was changed to include all sections with traffic volume of up to 20 pair of trains per day.

Combining duties in locomotive and yard master brigades makes it possible to free up more than 700 firemen.

As is the case on all the rest of the country's railroads, before the experiment on the Belourssian Railroad, technical and commercial inspections of the trains were performed by various brigades simultaneously. Having analyzed the causes of a failed past attempt at combining technical and commercial train inspection, railroad specialists came to the conclusion that this experience could be revived without increasing the time for train handling and without hurting

the quality of the inspections given more qualified instruction of car inspectors in the rules for freight loading, tie-down and transportation, a greater degree of interest for car inspectors for good, rapid work and improving the lighting in certain station yards. As a result of the measures which were carried out, about 350 more persons were freed up. Just one acceptance inspector was left in each yard to coordinate the work of commercial inspection, resolution of contraversial questions and filling out documents whenever troubles turn up. The new order of inspection was introduced on the railroad in July, 1985, and one may say that it has completely justified itself: the number of unsecured shipment incidents declined in comparison with corresponding periods of previous years.

A large program to study the utilization of work time also preceeded the experiment. More than 1,500 photos were taken of the work day during the past 2 years. It was revealed that at the railroad's enterprises, wasted work time constituted from 10 to 12 percent of the work day. It became apparent that aside from measures enumerated above, it was possible to increase labor productivity considerably by utilizing internal resources, primarily broad-scale combination of professions and duties, expansion of servicing areas and a more active incorporation of labor organization on the basis of brigades, with certification of work places in all departments, primarily those of rolling stock and track repair, in the traffic departments and in the containerized shipment and commercial operations departments.

Within the rail car service, the little-active control points (KP) and technical transfer points (PTP [punkty tekhnicheskoy peredachi ]) were eliminated on industrial sidings. The duties of the workers at these points were shifted to engineers on switch engines, yard masters and station acceptance inspectors. At stations with container yards, car inspection was combined with container inspection. At certain individual stations, the duties of container inspector are given to freight and baggage acceptance inspectors. At a number of maintenance points the professions of examiner and mechanic for car repair are combined. The duties of car safety inspector were imparted to car inspectors or mechanics of autonomous refrigerated car sections, which permitted us to free up the entire contingent of car safety inspectors.

The range of combination of professions and duties at the stations has been expanded significantly. At individual stations, the duties of the heads of freight yards and station engineers have been reduced. The station masters and their deputies have taken on their duties. Service areas for freight and baggage acceptance inspectors and station workers have been broadened. The station duty personnel have taken on the duties of switch yard tower semafore handlers and operators.

At many intermediate stations and stopping points the duties of station workers and firemen have been assigned during the winter period to the station duty personnel or ticket cashiers or acceptance inspectors; the duties of ticket cashiers with a light work load are performed by the station duty personnel or freight cashiers, etc.

Wherever switching is done manually, it has been shifted in some regions to the yard master or another worker.



While developing the measures to be undertaken during the course of the experiment, we devoted much attention to the measures for further improving the structure of production management, the realization of which provides more than 12 percent of contingent being freed-up.

Staffs are being re-examined in all departments and standards are being made more strict: one foreman for 35-50 workers, one freed brigade leader for not less than 15 workers, and for not less than 10 workers for track maintenance; a senior foreman or track section head to have under him 5 and more foremen or districts. The post of senior electrician is to be introduced in communications divisions if he oversees the work of no less than 5 electricians. Other measures have been taken aside from those enumerated. A number of organizations were united:

The Orsha computer station and the railroad's, and they are both now part of the railroad's computer center; the Brest computer station with the Brest computer center, which handles export-import shipments.

Freight accounting offices for all railroad departments have been combined into a technological center for processing shipping documents. As a result, one structural subdivision has been formed from 6. The staff has been reduced by a third, and the concentration of shipping document processing in one place and situating it in the railroad's computer center building facilitated the task of shifting the laborious accounting operations onto the shoulders of a computer, which accelerated all shipping accounts and increased their reliability.

Several structural subdivisions have been vacated. Instead of icing points, points to service shipments of perishable goods and poultry have been organized, and a number of stations with little activity have been closed, and this process has still not been completed. A program to concentrate freight operations at a smaller number of stations has been developed and will be put into operation, and this will permit us to raise the level of mechanization of loading and unloading operations, reduce their cost, raise productivity and, most importantly, thereby make it possible to resolve social questions more efficiently for this subdivision.

The system of managing operational activity both in the railroad's traffic management service [v sluzhbe dvizheniya upravleniya dorogi ] and in the railroad's departments has been improved.

In all of the railroad's departments, the 4 production divisions (locomotive rail car, track and signalization and communications) and the departments' technological groups have been combined into a single production and technical division with a significant reduction in staff. A commission headed by the chief engineer--the first deputy head of the railroad was established by the economic experiment for operational management. The commission was also comprised of the deputy head of the railroad for cadre, the secretary of Dorprofsozh [Railroad committee of the trade union of rail transport workers], the railroad inspector for traffic safety and the heads of the basic services and divisions of the railroad's administration. Similar commissions for conducting the experiment were set up at the railroad's departments and enterprises.

Not only the enterprises, but the organization of the departments and the railroad administration were drawn into actively developing and implementing the measures.

The collective received considerable practical assistance in carrying out the experiment from the Belorussian Communist Party Central Committee, the republic's Council of Ministers local party and soviet bodies, as well as from USSR Gosplan, the MPS, USSR Ministry of Finance, the USSR State Committee on Labor and Social Problems and VTsSPS [All-Union Central Council of Trade Unions].

The quotas received from the railroad management for growth of labor productivity, freeing up the contingent of workers and savings in the wage fund were closely linked to the step-by-step rate at which the workers convert to the new tariff rates (wage rates). The question of setting the step-by-step rate at which the workers were to convert to the new tariff rates (wage rates) turned out also to be complicated, and many variants were examined and analyzed. After thorough evaluation, we reached the conclusion, which life itself confirmed, that it was the most applicable and expedient to make the conversion profession by profession (by order of importance and participation of the workers in the shipping process) in 3 stages.

In the first stage (since 1 July 1985), workers employed in routine maintenance and factory repair of locomotives, equipping and supply of fuel to locomotives; contact network workers and workers at traction substations employed in inspection and routine factory and depot repair of cars and containers, preparation of tank cars for filling and washing out box cars and insulated cars; personnel for forming up trains, considering engineering and technical workers, office workers, locomotive brigades and other professions which are included in the comprehensive brigades at a station who are doing track maintenance; electricians and electrical mechanics for STsB [signalization, centralization and block signaling] and communications; electric power supply sector electricians; repair and inspection shop workers; and loaders and equipment operators employed in loading and unloading operations were converted to the new tariff rates. In all, more than 40 percent of those workers subject to conversion were shifted over to the new tariff rates (wage rates).

In the second stage (since 1 Oct 1985), workers and office workers (those not considered in the first stage) at stations and terminals and junior service personnel were converted who combine duties in the locomotive yard master brigades.

In the third stage (since 1 Dec 1985), administrators and engineering and technical workers (other than those considered in the first stage) and locomotive brigades (other than those considered in stages 1 and 2) were converted. As a mandatory condition of the experiment, it was specified that the actual freeing up of a number of workers preceded the deadlines for stage-by-stage introduction of the increased tariff rates (wage rates) for the given category (group) of workers.

Supplementary quotas beyond the set annual plan were developed and given to the railroad's divisions to make up for lags in shipping volume in the first

quarter of 1985 and to insure the estimated growth in labor productivity, taking into consideration losses which would be permitted and the capabilities of the railroad's departments. This act mobilized the department's workers to accelerate car turnaround time, to meet the shipping volume and to improve in qualitative indicators.

Much work has been done to improve and regulate the establishment of labor standards. To these ends, quotas were set for each department of the railroad for increasing the standards for processing and reducing labor costs. In accordance with these quotas, the department heads set differentiated sizes for the increases in current processing standards for each enterprise for piece workers according to the type of production activity; they also set differentiated standards for the reduction of labor costs for senior technical personnel, office workers, junior service personnel and workers on a time rate wage system. More than 40,000 standards for piece workers were re-examined. Throughout the system, they were raised by an average of 10 percent. Standardized quotas were increased up to 15 percent for time-rate workers. The level at which time-rate workers reach standardized quotas increased to 55 percent on 31 Mar 1986. As a result, labor costs were reduced by 16.7 percent. Standards for tidying up in production and service facilities have been increased. Operations under the conditions of the experiment presupposed a further improvement of all quality indicators in the utilization of rolling stock. In this light, for example, meeting the needs of the railroad's departments for empty cars was insured by their fulfilling plan quotas for the qualitative indicators for rolling stock utilization.

In connection with the experiment, it was necessary to re-examine the regulation for payment of bonuses, both with regard to savings in wages and in the material incentive fund as applicable to the stage-by-stage introduction of the new wage conditions, which exclude overexpenditure of the wage and material incentive fund and which insure a progressive correlation between the growth of labor productivity and wages. New tariffs were set in connection with the introduction of the new tariff rates and wage rates, and workers [pay] grades, the wages and duties of management, senior technical personnel and office workers were re-examined in accordance with job title and the system of wage rates. Tariffs, rates and wage rates were increased [for] 85,000 persons.

/The chief result of the experiment is the fact that in 1985 a labor productivity growth rate was achieved which was greater than that of the years 1981-1984 by a factor of 4.5, and on the whole for the 11th Five-Year Plan, the growth in labor productivity was 22.8 percent, with a targeted rate of 7.5 percent, i.e. on this point, the five-year plan was over-fulfilled by a factor of 3./ For the [first] 4 months of 1986, labor productivity grew by 24.1 percent as compared with a similar period last year. All technical and economic indicators for 1985 were improved in comparison with the past year, including over-fulfilling by 2.1 percent the plan for freight dispatching, and car idle time is down. Rail car productivity is increased by 3.7 percent, that for the locomotive, by 1.7 percent, train weight, by 87 tons, average load per car, by 1 ton and profit by 26.4 percent more than in 1984.

More than 12,000 persons were freed up and can be used on other jobs and in other sectors. Preliminary estimates show that the savings to the national economy is reaching 20 million rubles.

Based on work totals for the second quarter and the first half-year of 1985, the railroad's collective was awarded challenge Red Banners of the MPS and the Central Committee of the Union of Rail Transport and Transport Construction Workers, and based on the totals for 1985, with the challenge Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the VTsSPS and the Central Committee of the VLKSM [All-Union Leninist Young Communist League]. Many of the railroad's collectives also emerged as winners in socialist competitions throughout the industry.

The experiment raised the prestige of the work of engineering cadres, elevated the social significance of engineering work and its role in production activity. Qualificational categories have been introduced for engineers, economists and technicians with the aim of taking fuller account in salaries as a function of the differences in qualifications and the complexity of jobs being performed.

Now a more improved structure for industry production laboratories is being worked out by combining them into a united design and technical center, and the possibilities for converting to a two-unit system of industry management for enterprises determining engineering services (locomotive, rail car, signalization and communications and electric power supply) and centralization of management for all operational work are being examined.

The railroad collective acknowledges that the experiment makes no automatic guarantees and does not insure improvement in all directions. Moreover, it is possible to work under the conditions of the experiment with reduced staff and achieve positive results only under certain conditions. These include strict labor and technical discipline, constant search for reserves, elimination of bottlenecks, initiative and a creative approach to business, a constant elevation of the technical and technological level of production and improvement in the structure of management and the organization and setting of standards for labor. The creation of these conditions, the direct organization of work is a topic of constant concern for the management at all levels and of all social units. The conditions which were noted are necessary not only for consolidating that which has been achieved, but, and most importantly, for mastering new boundaries which were determined by the resolutions of the 27th Party Congress of the CPSU and the June (1986) Plenum of the CPSU Central Committee.

The task of emerging in the 12th Five-Year Plan at the highest level of labor productivity in the world confronts the nation's railroad workers. Having weighed their capabilities, the railroad's collective obligated themselves to produce an increase in labor productivity of no less than 15 percent compared with 1985. If one considers that during the course of the experiment substantial work has already been done on the railroad, as a result of which more than 13 percent of primary occupation workers have been freed up, and the chief factor to the growth of labor productivity is an increase in shipment volume (a 9-10 percent increase has been projected for the current five-year plan), the complexity and the responsibility of the commitments made by the line's senior technical workers can be understood. But they are well-founded. The

main portion of the increase in productivity will be obtained by acceleration of modernization of production by the priority directing of capital investments (no less than 65 percent) toward renovation and re-equipping, the incorporation of technologies which require few people and comprehensive mechanization, first of all on such labor-intensive jobs as track maintenance and engine and car repair. The conversion to electric traction is being planned for freight traffic on the Minsk-Osipovichy and Minsk-Molodechno sectors, and we are planning to complete on the whole outfitting open sections of the line with automatic block signaling and electrical centralization of switches and station signals, as well as for the tracks into locomotive and rail car depots. The "Express-2" system will be incorporated at the Minsk-Passazhirskiy station.

We may also gain significant effect from further improvements in the organization and increase of labor productivity from senior technical workers on shipments, whose number does not depend on the shipping volume. We are planning to increase the efficiency with which fixed capital is utilized, first of all by raising the productivity of locomotives and freight cars both by accelerating their turnaround time and by increasing the weight of freight trains by not less than 423 tons [sic!] and the section speed by 1.2 kilometers per hour. The load for each car will be increased by no less than 2.5 tons over 1985. To these ends, specific goal-oriented, intensive technologies have been developed to increase the load and the rate of traffic speed of freight trains, to improve the operation of junction railroad stations and the organization of work on the line and to make the repair of locomotives, rail cars and the track better.

Concrete quotas for work volume, the [workers'] contingent, the labor productivity growth rate and the average monthly salary have been worked out by the railroad's economic planning division and confirmed by the technical and economic council for each year of the five-year plan, taking into consideration fulfillment of the indicated programs and measures for subsequent growth of labor productivity.

The figures for the first half-year of 1986 attest to the fact that the collective is off to a good start. The railroad was awarded the challenge Red Banner of the Ministry of Railroads and the Central Committee of the Union of Rail Transport and Transport Construction Workers for successfully fulfilling socialist commitments for the first quarter of this year. The quota for freight turnaround was over-fulfilled by 10.5 percent, car turnaround time was reduced by 0.03 days and car idle time at stations was reduced. The quota for average train weight was overfulfilled by 62 tons, or 2.2 percent, and more than 1.05 tons, or 2.4 percent beyond the plan was being loaded into each car. All economic indicators were satisfactorily met. Labor productivity grew by 11.2 percent beyond the plan, and by 28.3 percent compared to the first quarter of 1985, and with an increase of 15.2 percent in the average monthly salary, the profit beyond the plan was 3.882 million rubles.

The experiment on the Belorussian Railroad is becoming a progressive experience which will be employed by 10 of the country's mainlines and the Minsk and Kharkov subway systems.

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## MARITIME AND RIVER FLEETS

### CHIEF ON WHITE SEA-BALTIC CANAL RECONSTRUCTION

Moscow RECHNOY TRANSPORT in Russian No 6, Jun 86 pp 36-37

[Article by V. Aleksandrov, chief of the White Sea-Baltic Canal under the rubric "Ministry Decision Required": "Reconstruction of the White Sea-Baltic Canal: Results and Conclusions"]

[Text] The reconstruction and technical re-equipment of production facilities have been defined by decisions of the 27th CPSU Congress as basic ways of effective utilization of capital investments. However, improvement is required in the existing system of planning, financing, and material technical supply without considering the specifics construction and installation work at facilities undergoing renovation without work stoppage. Analyzing the experience of organizing, executing, and planning construction work being performed on the complex hydraulic structures of the White Sea-Baltic Canal, the author of this article makes some suggestions for accelerating the pace of the reconstruction and for increasing the builders' interest in performing it.

The White Sea-Baltic Canal became operational in 1933. Its structures built of local construction materials—wood, stone, peat, clay, sand—for the most part are unique in construction and simplicity of operation. The canal's navigation facilities were designed to handle 1,000-ton lighters behind a tow-bar.

During the years of the Great Patriotic War, a considerable portion of the hydraulic power systems were destroyed (to varying degrees) and later repaired according to post war standards.

However, in the 1960's large-capacity "river-sea" vessels began operating on the route (today their number exceeds 90 percent of the total number being locked through). The condition of the lock elements deteriorated, having lost part of their strength due to damages during the war and also as a result of increased weight from the new vessels for which they were not designed, and repair and restoration work was required for their normal maintenance. The amount of such work has increased annually. The operation of the transport

fleet under ice conditions (in late fall and early spring) has also complicated the technical condition of hydraulic structures. The structures also were not designed for such loads.

In this connection, the Ministry of the River Fleet made a decision to reconstruct the structures of the White Sea-Baltic Canal. Up until 1976 it was being done through capital repair resources without changing any of the structures, just by replacing outdated materials and elements that had lost their strength. In 1976 work was performed using state capital investments. This made it possible to accelerate the pace of reconstruction somewhat, strengthen the material and technical base of construction organizations, and partially change the main structures. Reconstruction is being accomplished by forces of specially created construction and installation subdivisions of the Canal Administration, since the Ministry of Transport Construction refused to act as the general contractor, justifying this by the fact that the work was being accomplished without shutting down the canal.

Indeed, the work is being done without halting navigation; the duration of the navigation period during all the years of reconstruction of the structures has not been reduced by a single day due to construction.

Planning work is being performed by the Leningrad State Institute for Planning in River Transportation.

The reconstruction is being done by sections. As a rule, a section includes not a hydraulic system or lock, but their elements, depending on the technical conditions—chamber walls, mooring posts, floodgates, embankments. Thanks to this, already today there has been a considerable improvement in operating reliability of the lock system, although the amount of construction and installation work performed is comparatively small. Such an organization of work has made it possible in a relatively short period of time to restore the operating efficiency of the most unreliable elements of the structures.

During these years the White Sea-Baltic Canal Administration gained considerable experience in reconstruction of production facilities, and today it is feasible to analyze it.

The conditions of performing the construction and installation work during reconstruction of the structures have a substantial effect on the pace, quality, and economic condition of construction organizations. Just what are these conditions?

Primarily, they include: the seasonal nature of performing construction and installation work; actual determination of the true condition of the structures and, consequently, the amount of work only after disassembly of the structures; completion of the work by the specified deadline, that is, by the precise date the icebreaker fleet approaches the canal in the spring; the dependency of the beginning of work in the fall (for disassembly of structures) on the dates navigation is closed down, determined by the weather conditions.

All this entails additional expenditures for which the construction and installation organizations are not compensated.

Reconstruction of a structure begins with the complete disassembly of any elements (for example, walls and ends of chambers, embankments) upon conclusion of navigation and drying of the canal. Navigation can begin the following year only after complete restoration of the disassembled structures and filling of the canal's pools with water. The dates for the start and end of work are not known until the last minute, which makes operational planning difficult and results in considerable material and labor expenditures, for example, due to idle time of construction equipment awaiting the end of navigation.

As a rule, only after disassembly of the structures is the actual amount of work identified, and frequently the construction workers are forced to perform much additional work for which metal, cement, labor resources, and equipment naturally was not envisioned. In some years the additional amounts for certain structures were 25 percent of the amount initially planned, which inevitably resulted in crash work, overtime work, and overexpenditure of the wage fund. Such a situation arises every year, even during winters with normal temperature conditions. Conditions of performing the work were considerably complicated in the winter of 1984/85 when the length of the construction period was cut in half due to the severe cold and threatened to delay opening of navigation. The opening of navigation was not delayed because in March and April the canal workers labored without any days off and more than 8 hours a day and motor transport was operated without preventive maintenance. As a result, not having delayed the start of navigation, the construction workers practically could not work in May and June—they repaired equipment and got themselves together. For example, in SMU-2 (Construction and Installation Administration 2) plan fulfillment during May was only 46.5 percent of that for April, and during June it was 41.4 percent. Usually the canal construction workers fulfill 50-55 percent of the annual program during the inter-navigation period lasting 42 percent of the year.

The reverse happens also. For example, when reconstructing lock chamber No 9, the amount of work (disassembly of the scale and subsequent laying of concrete) turned out to be considerably less than was planned, the result of inaccuracies in the documentation of 1933. The condition of the scale proved to be better than they figured, and the actual amount of work was less; this also entailed non-fulfillment of the annual program.

The situation is complicated by the fact that permanent dates for opening and closing navigation have not been established. Only in 1985 did the ministry set a permanent (one) day for closing navigation--9 November. But the date for opening navigation, as before, was not determined.

During the summer period the canal construction workers prepare form boards, reinforcing cages, and reinforcing mesh and haul construction materials, that is, they prepare for the upcoming winter period. This work does not fulfill the plan, but requires a considerable use of the wage fund and increases stocks of materials. In addition, during the summer period they build houses and domestic facilities. (During the winter time these facilities are not



built because of insufficient manpower.) With such a distribution of forces, the actual length of construction, for example, of house increases at least 2.5-fold compared to the norms. The situation is similar with the length of reconstruction of facilities. However, neither the RSFSR Ministry of the River Fleet, the Russian Republic Office of the Bank for Financing Capital Investments (Stroybank), nor the RSFSR Gosplan take these peculiarities of reconstructing canal facilities into account when planning capital investments and setting the deadlines for putting them into operation. The seasonal stock of metal and cement before the start of work in the fall is not very large and does not exceed 20-30 percent of the calculated amount. As a result, already in January they have to wait for supplies, which often leads to unproductive idle time and creates additional difficulties in making reinforced structures under conditions of winter and the limited time for reconstructing structures. Because of all these oversights, the construction organizations suffer financial losses, and the construction workers are deprived of bonuses.

It is a paradox but a fact that the canal construction organizations, which never delayed the opening of navigation and which overfulfill the plan for committing fixed capital and for construction and installation work, almost never receive bonuses or places in socialist competition and do not have an enterprise fund.

The abovementioned circumstances inevitably lead to a considerable overfulfillment of the plan during certain months. As we know, the Stroybank pays only half-wages for the amount of construction and installation in excess of the plan. Therefore, the construction organizations, for example, having overfulfilled the plan in April in order to ensure timely opening of navigation and having done an expedient job from the standpoint of the national economy, inevitably have an overexpenditure of the wage fund, which results in penalties on the part of the Stroybank. For example, the SMU-1, having fulfilled the annual plan for construction and installation work by 113.2 percent in 1985, has an overexpenditure of the relative wage fund amounting to 16,800 rubles. Under these conditions it is practically useless to talk about brigade contract. It is impossible to explain to the workers why wages are not always paid on time when they work well. The offices of the Stroybank resolve questions of financing and extending credit for reconstruction of production facilities based on general statutes, that is, the existing practice of capital construction. In our opinion, a number of questions when performing reconstruction should be handled differently. Any clarification in the amount of construction work (either more or less), inevitable during reconstruction, becomes an insoluble problem and requires practically a review (re-approval) of the planning estimates. Utilizing its rights, the Stroybank forces the construction organizations to carry out the work first at projects under construction and does not pay wages for the amount of work done at projects not under construction over and above the quarterly plan. This correct approach under conditions of our reconstruction sometimes becomes an artificial obstacle which is practically impossible to overcome. Putting a reconstructed canal into operation is a somewhat different matter from new construction.

When building a new lock, navigation begins only after completion of all work and after the State Commission has accepted it for operation. During

reconstruction, navigation can go on if all elements of the lock are operational prior to the start of the navigation period. The White Sea-Baltic Canal Administration determines the amount of work and is responsible for the safety and operating reliability of the structures and the fleet being locked through. Sometimes certain types of work must be done during the intervals between locking. As a result, it turns out that projects, which in the interests of the sector and the national economy must without fail be completed (built and turned over) by a specific deadline, end up among those not put into operation, with all the ensuing consequences. A situation is created in which the organizations involved in material and technical supply stop allocating, for example, equipment and cable products to this project, and the finance measures of the Stroybank worsen the economic situation of the construction workers, forcing an acceleration of construction work, for example, in the winter time at a house under construction. Here it is clear to everyone that the house will not be built by the opening of navigation, but they have to write an explanation and measures for covering the "forced" overexpenditure of the wage fund in this case. These specific peculiarities of performing work on navigation structures are not taken into account by the organizations providing material and technical supply or by the Stroybank. The conclusion inevitably arises that during reconstruction of production facilities preference must be given not to projects formally put into operation, but to projects, structures, and elements necessary for timely opening of the next navigation season and subsequent operation.

For enterprises accomplishing a considerable amount of reconstruction with their own manpower, when the functions of buyer and contractor are combined in one person, the existing system of technical control over the quality of construction breaks down. Thus, the Canal Administration, as the enterprise engaged in operating the transportation link, is not supposed to have a technical inspection group. This is correct, for example, when monitoring the construction of residential houses being accomplished by nonspecialized organizations. But this Stroybank requirement is illegal for the same Canal Administration conducting the reconstruction when the amount of work for reconstruction of enterprises and construction of housing and social projects exceeds the amount of work related to the main activities. In this case, the losses due to deterioration in the quality of construction substantially exceed the savings from reducing the expenditures for maintaining a technical inspection group (section). In addition, the construction and installation administrations performing the reconstruction do not receive qualified assistance with respect to advanced construction technology and organizing the work, since there is no such section in the administration. Also, in our opinion, the Stroybank's requirements on long-range (for the five-year plan) listing of equipment are insufficiently justified.

We have considerable complaints against the planning institute and scientific research institutes.

Planning work for reconstruction of facilities is done in the same way as for new construction. Unfortunately, the plan does not have special methods for performing the work or organizing construction, although its role in reconstruction is growing sharply. There are many stock phrases in the project plans. For example, before slopes were strengthened by planting

grass. Today the planners suggest securing the slopes with sod, which under conditions of Karelia is hardly the optimum decision.

The planning estimates do not provide technological decisions for ensuring the planned pace of work. It is very unfortunate that the scientific subdivisions of the ministry are not involved with reconstruction issues. If they are, it is to study them and not offer practical recommendations. For example, the Moscow Institute of Water Transport Engineers has long proposed non-disassembly methods of determining the strength characteristics of concrete structures, which is of great importance in making a decision to place a structure under pressure. But it is not possible to obtain the research data in a timely manner. Full-scale measurements are made quickly, but at best the report comes in the middle of the navigation season when the quality of the concrete is already clear without it.

Questions of reconstruction would be simplified considerably if a operational planning group from the Leningrad State Institute for Planning in River Transportation was available at the canal; but the institute does not agree and finds support in the Ministry of the River Fleet.

Many years of experience in performing work on the canal show that the reconstruction of navigation hydraulic systems is considerably more effective than new construction; and reconstruction of the systems is most expedient without shutting them down.

The statutes in effect and the financing procedures do not provide incentives for construction and installation organizations to perform work on projects under reconstruction in general and particularly without interrupting their operational activities; construction organizations are not compensated for the additional costs which they incur when working on an operating canal.

In our opinion, it is inadmissible to plan indicators for construction and installation subdivisions on a current basis, since the reconstruction of even two identical locks is done in different ways depending on their technical condition, the nature of the surrounding terrain, the location of structures around them, the availability of roads, and other factors.

During reconstruction, a construction organization should be provided an incentive for early completion of any structural component of a structure, not just for the entire complex.

In our opinion, during reconstruction of lock systems without shutting them down, that is, with the planned seasonal nature of the work, the calculated (standard) periods of the length of construction and reconstruction of all projects should be determined on an individual basis for each project. Standards for seasonal stocks of materials under such conditions also need to be established according to the actual estimates. At the end of the year the construction workers need to have a stock of cement and reinforcement, as a minimum, for performing 50 percent of the work planned before the opening of the navigation season; metal and cement should be supplied according to the blueprints. Furthermore, metal structures should be delivered to the projects before the start of work.

Estimates for performing construction and installation work should provide only for the equipment the construction workers actually have at their disposal.

Since reconstruction is now becoming that basis of strengthening the material and technical base, it is necessary to speed up the resolution of questions economically affecting construction organizations. Reconstruction should be economically profitable, despite its labor-intensiveness. Sources of concern lie in the difference in costs for the national economy between the cost of new construction and reconstruction of projects.

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## MARITIME AND RIVER FLEETS

### PLANNED RSFSR WATERWAY DEVELOPMENT

Moscow RECHNOY TRANSPORT in Russian No 6, Jun 86 pp 38-40

[Article by K. Orlovich, deputy chief of the Main Administration of Waterways and Hydraulic Engineering Structures of the Ministry of the River Fleet: "Prospects of Development"]

[Text] The basic directions for waterway development and improving the conditions of navigation for the future have been determined based on scientific forecasts and studies of the sector's development. These questions have been worked up in more detail by sectorial planning institutes as a part of general patterns of development of individual shipping companies between 1986 and 1990 and for the period until the year 2000.

Reviewed at sessions of the Scientific and Technical Council and by the leadership of the ministry, they became the basis for compiling the five-year plan of waterway development. It gives special attention to the intensity of development, creating the most favorable conditions for effective use of the transport fleet on the main high-freight-traffic sections of waterways, and increasing the dependability of ensuring guaranteed depths. At the same time, there are plans to develop waterways and maintain navigation conditions on small and secondary rivers while observing the economical use of financial, fuel and energy, and material and technical resources, practically without increasing the number of workers of waterway management.

Completion of work to create the Unified Deepwater System in the European Portion of the RSFSR, the total length of which is 6,200 km, will have a most substantial effect on improving the entire transportation process. Today 75 percent of the freight volume in river vessels is transported over it. However, the existing gradation of depths, caused by the presence of three sections limiting navigation, does not permit loading the high-capacity fleet to full draft over the greater part of the navigation period.

The limiting sections on the Volga from Gorodets to Gorkiy (2.7-3.5 meters deep) and on the Kama from Chaykovskiy to Kambarka (3.3 meters deep) can be eliminated only after filling the Cheboksarskiy and Nizhnekamskiy reservoirs to the design levels (roughly planned for 1988-1989); on the lower Don from the Kochetovskiy Hydrosystem to Azov (3.6 meters deep) it can be eliminated by construction of the Bagayevskiy Complex Water Management Hydrosystem.

However, the planning studies carried out for its technical and economic justification by the State Institute for Planning in River Transportation are not finding a favorable solution in the RSFSR Ministry of Land Reclamation and Water Resources and directive bodies.

Another variant for solving this problem may be the construction of a second line of the Kochetovskiy Lock with a deep contour interval of the lower end and a complex of waterway work on the lower section of the Don.

In order to increase the traffic capacity, in 1988 there are plans to put into operation a second line of the Sheksninskiy Lock, the most overburdened on the Volga-Baltic route. Work will continue on the dividing pool to expand the canal and simultaneously reinforce the slopes with a stone embankment fill. No substantial changes in the qualitative state of the waterway are planned for the remaining sections of the Unified Deepwater System in the European Portion of the RSFSR.

The most critical tasks for waterway development will be in the Lena and Ob-Irtysh basins. Planning and construction of the Upper Lena Transport Hydrosystem is beginning with an approximate cost of 130 million rubles, which will make it possible to increase the depth up to 220-250 cm on the section from Osetrovo to Kirensk. At the same time, there are plans for blasthole drilling, rock clearing, and smoothing operations involving equipment from the Soyuzvzryvoprom [Trust for Drilling and Blasting Operations] of the USSR Ministry of Installation and Special Construction Work to deepen the Olekminskiy, Khatyn-Tumulskiy, and Yelovskiy shoals on the Lena River. The total cost of the operations is 40-50 million rubles. In early 1986, the State Institute for Planning in River Transportation [Giprorchtrans] and the Siberian State Institute for Planning in River Transportation [Sibgiprorchtrans] began planning these expensive and complex operations which will have to be performed in remote, sparsely populated regions with severe natural and climatic conditions which lack a base of contract construction organizations.

In order to prevent further shoaling in the area of Osetrovo Port, channel clearing operations are planned (in the amount of 300-500,000 rubles annually)—construction of dikes and dams. It is envisaged that in 1986 work will be completed on removing the signaling system on the difficult section of the "Shcheka" and opening up two-way ship traffic on it.

The Sibgiprorchtrans will provide a technical and economic assessment of the feasibility of increasing the depths on the sector Kirensk-Vitim and Yakutsk-Bykov Mys. With delivery of powerful dredge pumps to the Lena Basin Waterways Administration, there will be a real possibility of deepening shoals on the lower Lena, which are mainly built up with sandy soil.

The situation is somewhat different with prospective depths on such rivers as the Aldan and Vitim, whose river beds are made of heavy gravelly and rocky soils with numerous boulders and rock outcroppings.

Due to the high speed of currents and the limited depths, attempts made over 20 years by the Lena Basin Waterways Administration to increase the depths on

the upper Aldan by traditional methods, that is, using chain and bucket suction-tube dredgers and dredging cranes, have not yielded the desired stable results. Experience shows that fundamentally new equipment is needed--rock breaking units, powerful grab buckets, and other devices adapted for reliable operation in conditions of shoal water and a rapid current. The efforts of scientists and designers must be directed precisely at solving this problem. For now, the substantiating materials developed by the Sibgiprorrechtrans in 1985 for construction of a river port at the city of Tommot show that the long-term volume of shipments do not justify the considerable capital investments which are needed for reconstruction of the waterways and creating deepwater approaches to this port. In this connection, natural conditions are being maintained on the upper Aldan in the current five-year plan.

There is much work to be done in areas of oil and gas deposits in Western Siberia--expanding water areas and providing water approaches to the industrial port of Yamburg; developing water approaches to the Katrovozhskiy deposit of mineral and construction materials on the Sob River; and deepening of the estuarine sections of rivers emptying into the Obsko-Tazovskaya Bay, as well as navigation routes on the water area of the bay.

Questions of opening up small rivers in these regions to transportation are acquiring special importance.

In the 11th Five-Year Plan, work on opening up small rivers in these regions to transportation was carried out using the resources of the ministries and departments concerned, particularly the Ministry of the Gas Industry, the Ministry of Geology, and the Ministry of the Petroleum Industry. As a result, the necessary conditions for operation of the transport fleet were created on previously nonnavigable rivers (sections of various lengths) such as the Agan, Kazym, Pur, Taz, Bolshoy Salym, and Severnaya Sosva.

The experience gained between 1981 and 1985 in carrying out a complex of waterway operations for opening up small rivers to transportation shows that a detailed technical and economic justification and production plan for the work must be developed by planning institutes for each specific section of the river, since considerable capital investments and equipment are needed to accomplish the work. In doing this, it is necessary to determine precisely the actual amounts and sources of financing, freight delivery dates, and the types of transport fleet vessels, and composition of additional technical resources and to envision possible ecological changes and measures to prevent them.

For example, the cost of operations to open up a 25-km section of the Sob River is 9 million rubles. According to the plan for organizing the mining of mineral and construction materials at the Katrovozhskiy deposits developed by the Giprorrechtrans for deepening the estuarine section of this river, which is composed of heavy soils with large rock inclusions and frozen ground, it requires dredge pumps with an output of 2,500 cubic meters per hour, chain and bucket suction-tube dredger with an output of 550 cubic meters per hour, and grab cranes with a lifting capacity of 16 tons.

As a rule, in connection with the insignificant amount of shipments, opening up small rivers begins with the operation of the transport fleet only in the spring (high water) period of navigation. Therefore, above all it is necessary to study them and set out navigation safety signs, for which shallow series transport and buoyage and beaconage ships are suitable.

In subsequent stages it is important to carry out continually channel-cleaning operations for clearing out fallen trees, rocks, freight waste, ownerless equipment and mechanisms, and metal scrap by using floating grab cranes with a lifting capacity of 5 tons, 200-400 ton barges, and 150-450 hp (110-330 kW) tugs. If the volume of shipments increase, it will be necessary to organize navigation throughout the entire navigation period and, consequently, increase the amount of dredging as well.

Experience amassed during recent years by the Irtysh Basin Waterways Administration in opening up the Nadym, Sob, Kazym, Pur, Agan, and Bakh rivers shows that these operations are performed with the greatest effect and in compressed periods of time by using available dredge pumps having a capacity of 700-2,500 cubic meters per hour and chain and bucket suction-tube dredgers having a capacity of 250-550 cubic meters per hour. The earlier existing opinion about using small-sized low-capacity suction-type dredgers for these purposes is incorrect, since it does not take into account the peculiarities of the current period related to conserving labor, fuel and energy, and material and technical resources. Experience in organizing the operations and an analysis of the actual expenditures show that, according to specific costs for creating 1 km of waterway, powerful highly productive units are the most effective. However, the use of such vessels is affected by the constraints of the conditions and the inconvenience of removing the soil extracted using a floating pipeline. Therefore, when opening up new rivers it is recommended that a stern attachment with a turning overhanging hydraulic fill pipeline be used; it can be used to expel the soil on the dry bank or into the water. The attachment has successfully underwent experimental operation for five navigation seasons on a dredge pump with a capacity of 700 cubic meters per hour at the Novgorod Technical Section.

In the Amur Basin, navigation conditions on the Zeya River below the Zeyskaya Hydroelectric Power Station (GES) will be improved somewhat by regulating the navigation releases, in connection with which the Zeyskoye Reservoir has been filled to the design levels.

In the Angara-Yenisey Basin, there are plans to fill the Sayano-Shushenskaya GES reservoir to the design levels and continue work on opening the reservoir to transportation. Putting the Mayskaya GES into operation, which will act as a counter-regulator in utilization of water resources, will have a favorable influence on the release conditions downstream. With the damming of the Angara at the site of the Boguchanskaya GES, a temporary logging lock with a 2-3 meter head will operate for the period of logging operations in the flooding area. It is located at the dam site on the left bank. After damming the Angara, work will begin on opening up the Boguchansk Reservoir to transportation. When filling the reservoir to the design levels, the plan does not provide for navigation passes as part of the Boguchansk Hydrosystem.



In the Ob and Pechora basins, for which long-term programs have been developed for increasing guaranteed depths, there are river sections for which capital investments and equipment (suction-tube dredgers, floating cranes, tugs, barges, and so forth) have been allocated to open them up transportation based on compiled technical and economic substantiations and plans (involving the Central Scientific Research Institute of Economics and Operation of Water Transportation, the Novosibirsk Institute of Water Transportation Engineers, and the Moscow State University). These operations begun in the 11th Five-Year Plan will continue. The end result of the long-term programs will be an increase and reliable maintenance of guaranteed depths of 150 cm on the Ob from the junction of the Biya and the Katun rivers to Barnaul and 150-160 cm on the Pechora from the city of Pechora to the city of Naryan-Mar.

Hydraulic engineering work is being done on Siberian rivers: the Shulbinsk Hydrosystem with a shipping lock on the Irtysh; the Krapivinskiy, Bureya, Vilyuysk and Kolyma hydrosystems, which do not have navigation passes but which affect the condition and development of waterways primarily through more favorable regulation of the run-off in the downstream walls of the hydrosystems.

In organizing the entire complex of waterway operations on open rivers, much attention is given to increasing the reliability of maintaining guaranteed depths on individual high freight traffic sections on which many years of ensuring design levels have not met standards.

Only in the beginning of the 11th Five-Year Plan has it been possible to begin this very important work in connection with the continuing lowering of the water level. In past years the total length of sections on which the design levels were brought close to the standard values was 5,000 km. However, there are many sections, especially in the Lena, Ob-Irtysh, Amur, Sukhona, and other basins where similar operations are to be continued.

In the absence of man-made structures in the channel (underwater passages, water intakes, moorages, slipways) and sufficient power of the dredging fleet, the necessary lowering of the design level can be achieved through a corresponding lowering of the design bottom, that is, without changing the guaranteed depths.

In order to resolve successfully the set tasks for waterway development, especially in the eastern basins, the line waterway management subdivisions need a modern technical, service, and auxiliary fleet of various vessels able to be used effectively under specific conditions.

As older vessels are removed from service, the fleet of dredge pumps will be regenerated by deliveries from Czechoslovakia and Finland. For example, R-517-01 self-propelled lake dredge pumps with a capacity of 2,500 cubic meters per hour will be supplied by the "Cheshskaya Iodenitsa" shipyard.

Based on plan studies, in the current five-year plan construction will begin on SB-500/440 non-self-propelled river dredge pumps with a capacity of 500 cubic meters per hour. At the same time, design work is underway on

developing similar SB-700/Kh dredge pumps with a capacity of 1,000 cubic meters per hour.

In 1986 the Lena Basin Waterways Administration will receive for development of barge sections, two sea dredge pumps, the "Indigirka" and "Anabar," from the A/O Vyartsilya shipyard. They have dragging and attacking nozzles and cantilever discharge of the soil overboard to a distance of up to 50 meters.

There are plans to continue building R-161 river dredge pumps having a capacity of 1,000 cubic meters per hour at the Plant imeni Ulyanov (Lenin). Beginning in 1988, the fleet of chain and bucket suction-type dredgers will be upgraded (without increasing the total number) with the delivery from the Leninskaya Kuznitsa Shipyards of self-propelled lake suction-type dredgers with a capacity of 600 cubic meters per hour and modernized 15191 suction-type dredgers (beginning in 1988).

The Plant imeni Ulyanov (Lenin) is building a series of R-36 suction-type dredgers with a capacity of 550 cubic meters per hour. Shipyards of the city of Komarno will deliver 92-035 river chain and bucket suction-type dredgers having a capacity of 250 cubic meters per hour.

A design has not yet been found for chain and bucket suction-type dredgers for conditions of the Amur River, characterized by high current speeds, sharp fluctuations in the water level, and heavy underlying soil. The peculiarities of the water and geological conditions of the Amur River preclude using existing types of suction-tube dredgers due to the insufficient depth of frame lowering, the low capacity of the dredgers, and low power of the winches. Probably, the only way is to import three specialized chain and bucket suction-tube dredgers with a capacity of 750-1,000 cubic meters per hour in a set with dump scows. Operations will continue in the basin for further improving the navigation conditions of the rocky Soyuznyy Shoal by using rock-breaking equipment with a pneumatic hammer.

The specific nature of the dredging process and organizing the work of a dredging caravan is that a shortage or lack of an auxiliary fleet--dump scows, floating pipelines, buoyage and beaconage vessels, sounding vessels, tugs--sharply reduces the effectiveness of using powerful, high-capacity suction-type dredge pumps.

Self-propelled 81030 scows with bottom doors having a capacity of 200 cubic meters and 225 hp (176 kW) will be built as a service and auxiliary fleet for the dredging caravans (by the Plant imeni Ulyanov (Lenin)). In addition, in the Yenisey Basin Waterways Administration, the Ladeyskiy shops (Krasnoyarsk) will continue building non-self-propelled R-152 scows with an opening hull and a capacity of 150 cubic meters. There are plans to set up production of these scows in the Lena Basin as well.

As we know, in this five-year plan the capacities of the Kashirskiy Plant and also the Konstantinovsk, Omsk, Kirensk, and Chulym shops will not yet meet not only the needs for buoyage and beaconage vessels, but also for replacing outdated T-101 motor ships. Therefore, the R-94 and 946B motorized flat-

bottom vessels will stop being built by 1987 in order to boost construction of R-121 buoyage and beaconage ships.

Special attention must be given to maintaining the active motorized flat-bottom vessels, scows, buoyage and beaconage, sounding, and other vessels of the technical fleet in working condition. Reliable and quality repair of this type of fleet acquires paramount importance. Series-produced transport fleet vessels from the types being built at industrial enterprises of the Ministry of the River Fleet and the shipbuilding industry will be used as tugs and barges (for the needs of waterway management). Guard ships, floating pipelines, mechanized trawls, buoys, and other equipment, as before, will be built at the subsidiary enterprises of the basin waterway administrations and canal administrations.

Series-produced grab cranes with a lifting capacity of 5 tons, built by the Teplokhod Plant, may be the sole mechanisms for conducting smoothing operations and building half-dikes and training walls from local materials. They should be supplied to the waterway administrations, including in disassembled form, mainly to the eastern basins where they have the capability of assembling them with their own forces.

Dredging operations are planned to be carried out by existing dredging equipment; construction of new equipment may begin no earlier than the 13th Five-Year Plan.

The main equipment for trawling operations remains soft and rigid trawls of various designs made using internal resources and adapted for the local conditions of each section. Much attention needs to be given to creating wide-span trawls in order to increase the quality of trawling and reduce manual labor.

Experimental design operations began in 1986 for developing a sonar for inland navigation ships, which can be used in order to determine the location of the edges of the navigation passages underwater. Industrial production of these instruments can be expected at the end of the five-year plan.

Waterway development is inseparably linked with improving the navigational safety devices on the waterways and strengthening the material and technical base of buoyage and beaconage.

The arrangement patterns of navigation buoys and beacons in effect today on practically the entire system of inland waterways meet navigation requirements. At the same time, the channel reformations taking place, the dredging, smoothing, trawling, and bottom-clearing operations being performed, and the amassed navigation experience of various types of vessels on individual sections make it necessary to continue to improve the marker arrangement patterns. The new requirements, which have emerged in connection with the extended operation of the fleet under ice conditions in the fall and spring periods of navigation (when floating markers generally are not operating), once again have so clearly demonstrated the urgent need for developing a continuous chain of shore markers. Taking into account the experience gained on the Volga-Baltic route and in the Volga and Kama basins,

construction of range signs, channel beacons, and marker signs on man-made foundations will become widespread.

Operations will continue on straightening and widening navigational passages, undercutting the edges, and removing silt, rock fragments, and individual obstacles. Furthermore, one must bear in mind that the arrangement of markers must be improved without increasing their total number. Special attention should be given to a stable arrangement of markers, not permitting frequent and unjustified changes. In many sections there is a real possibility of maintaining them in a fixed pattern for many years. This makes it easier for the navigators to get oriented on inland waterways and increases the quality of their maintenance.

The main task of all buoyage and beaconage workers after working out an approval of a pattern of arranging the markers is its strict observation on each section of the river, providing timely and reliable information to navigators about changes in waterway conditions.

FROM THE EDITOR. The program outlined in this article contains the basic directions for inland waterway development. The Main Administration of Waterways and Hydraulic Engineering Structures is willing to consider additional specific suggestions readers may have for improving navigational conditions for the purpose of their practical resolution. We await your response.

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## MARITIME AND RIVER FLEETS

### MORE ON FLEET'S CHOICE OF SATELLITE NAVIGATING EQUIPMENT

Moscow MORSKOY FLOT in Russian No 7, Jul 86 pp 44-45

[Article by Candidate of Technical Sciences A. Baskin and B. Mikhaylov, captain of long-range navigation: "What Kind of Satellite Receiver Displays Does the Fleet Need?"]

[Text] In recent years dozens of articles have been published in departmental publications of the Ministry of the Maritime Fleet describing various models of satellite navigating system (SNS) receiver displays, test results, experimental operation, and summarizing the experience of using them. Certain patterns can be seen in the authors' stands in these articles which are not directly related either to the topic being discussed or to the experience or position of the author.

The SNS receiver displays are seen as a "black box," to which the author has managed to give such and such peculiarities (parameters, characteristics). They generally talk about the satellite system in the same vein as textbooks on astronomy talk about the heavenly bodies, something beyond the power of man. Of course there are references about the discreteness of satellite observations, but in the context of their dependency on the number of satellites in the system. Usually here is where they cite the average frequency of observations in the area of the studies and during the period they are conducted. Greatest attention is given to the accuracy of observation and factors determining the accuracy. The model ensuring the greatest accuracy of position fixing is unconditionally considered the best.

We will try to break these patterns and do so based on results of long-term comparative testing of receiver displays of the SNS Tranzit, both single-channel (the FSN-20 and FSN-70 made by the Japanese firm Furuno; the MX-11-2 and MX-5102 made by the U.S. firm Magnavox; and the SAN-182 made by the Japanese firm Kodan) and two-channel (the MX-1107, MX1502, and SAN-185), conducted by the Hydrographic Enterprise of the Ministry of the Maritime Fleet between 1980 and 1985 on the hydrographic vessel Pavel Bashmakov and the icebreaker Peter Pakhtusov. Based on these tests we will try to formulate the operational requirements for SNS receiver displays.

In doing this, we will proceed from the fact that the number of channels as well as the accuracy and frequency of observations are determined not only by

objective characteristics of the satellite navigating system, but also by subjective and comparatively easily variable parameters of a specific receiver display model, primarily the programs of its interaction with the satellites.

We would remind you that the accuracy of satellite observation of the ship's path is determined basically by the instrumental error of the receiver display and the error in the difference between the values of the true and calculated speeds. The instrumental error should be less with a two-channel receiver display, because it calculates the deviation of radiowave propagation speed from the calculated speed.

The tests showed, however, that the differences in instrumental accuracy of single- and two-channel models are noticeably less than the influence of low-accuracy observations of the ship's path not subject to rejection. For this reason, the actual instrumental accuracy of all single- and two-channel models tested is 0.1-0.2 miles, regardless of the technical or algorithmic devices of the designers.

The speed component of the observation error when using a relative log, and the absolute majority of domestic vessels are equipped with precisely these speed meters, increases the error of satellite position fixing by an average of 0.2 miles for each node of divergence of true and measured speeds. Included in this divergence and actually causing its value are currents negligible to the relative log.

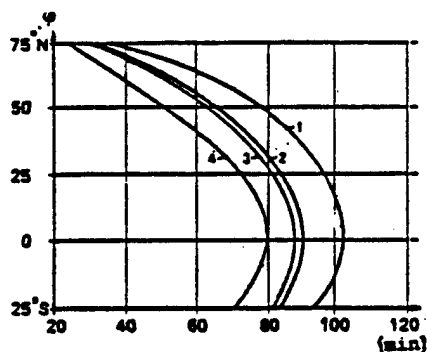
As a result, in the ocean where current speed is usually less than 0.5 knots, the speed error is negligible, and the accuracy of observation is determined completely by the instrumental error of the receiver display, that is, it is within the aforementioned range of 0.1-0.2 miles. If you take the IMO criterion as the basis (4 percent of the distance to the nearest hazard with the probability of 0.95), the cited accuracy is excessive already at distances from the hazard exceeding 10 miles, and in the ocean it is absolutely overstated.

At the same time, near the shores where a high accuracy of position fixing is necessary for ensuring safe navigation, the current speeds negligible to the relative log are usually greater than 0.5 knots, and in such conditions the accuracy of observation on a vessel's path is determined completely by the speed error. The influence of instrumental error is negligible.

Consequently, both out on the ocean and near the coasts the instrumental accuracy of SNS receiver displays do not have substantial importance for navigators. So why is so much written about it? Because it is so easy to obtain it: on a vessel at dockside, in a navigation chamber, or in a laboratory it is sufficient to take 50-100 observations, find the average coordinates, and according to the deviations from the average obtain convincing results which no one can refute, for they are actually correct...but not very useful.

But that is not all. Out on the ocean, where the reckoning error is roughly equal to 4 percent of navigation, after only 1 hour of observation at a speed of 15 knots its accuracy will have virtually no effect on the magnitude of

closure (or for that matter on the accuracy of the dead-reckoning position). But near the coasts, where reckoning error is noticeably greater (10 percent of navigation according to Navigation Manual-82 (NShS-82)), observation error ceases to affect the magnitude of closure already after 25-30 minutes. But what is 25-30 minutes? It is the average interval between satellite observations in the entire range of latitudes of the fleet's operation (see figure).



Relationship of frequency of observations to latitude for various receiver displays: 1—SAN-1 and SAN-5; 2—MX-5102; 3—FSN-70 (criterion 1); 4—FSN-70 (criterion 2).

Hence the main conclusion follows. The main limitation in using SNS receiver displays is not accuracy, but discreteness of observations made. The accuracy of satellite observations is acceptable in principle in the entire range of its possible values from 0.05 to 2.0 miles. Therefore, the best SNS receiver display model is the one which ensures the receipt of the greater number of observations, even though the accuracy is somewhat lower. For example, the FSN-70 receiver display consistently receives 10-40 percent more observations in the latitude range from 71 degrees north to 23 degrees south than the SAN-185. That means that the first model is better. What is more, the FSN-70 still has a 15 percent "reserve of observations" if you switch to criterion selection 2.

The test results directly point out ways to increase the number of observations received by 30-50 percent by improving the software of the receiver displays. First, one should examine the criteria of selecting satellites for observation. Presently, in all models these criteria, dropping out a considerable number of fairly accurate position fixes, at the same time omit observations having an accuracy many times below the average. In particular, given an equal accuracy of observations, the range of permissible culminating heights is 5-75 degrees for the SAN-185, 6-74 degrees (selection criterion 1) and 4-78 degrees (selection criterion 2) for the FSN-70, 7-70 degrees for the MX-5102, and 10-70 degrees for the MX-1107. The minimum permissible number of position lines is 20 for the first, 5 for the second, and 10 for the third. The minimum "time clearance" between the received observations is 14 minutes for the first, 5 minutes for the second, 6 minutes for the third, and so forth.

An analysis shows that the following can be considered tolerable: five position lines, at least two of which must culminate from any side; the range of permissible culminating heights is 5-80 degrees; the permissible number of iterations is 6. It is possible to lower the requirements for all quality criteria even more provided that one uses as a terminal and perhaps the sole criterion of observation quality the long used comparison of coordinates of observed and current reckoning, the divergence of which must not exceed 10 percent of navigation after the last observation received for reckoning correction.

The source data for such a criterion are in the memories of all SNS receiver displays. Only the coefficient of 10 percent of the navigation should be input into the programs. This value has a high probability (can be considered 95-97 percent) and will serve as a sufficiently reliable guarantee of observation reliability, since it is based on the accuracy characteristics of the log and compass constantly controlled on the vessel. With an average frequency of observations of 40-100 min, this criterion will be 1-2.5 miles.

A special program of selecting satellites for observation, similar to the one used by the firm Magnavox, can serve as another way of increasing the number of observations received. Having established based on a preliminary forecast the satellites close in time or the satellites with critical culminating heights, the receiver display must update the forecast immediately prior to their ascent, assess the most reliable satellite, and work with it for a minimal time with a minimal number of measurements, filling in lost position lines by interpolation or even extrapolation of the data. Tests have shown that 6-8 observations of the 10 rejected can be used, having first assessed their probable reckoning closure.

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## MARITIME AND RIVER FLEETS

### PUMA ACV TESTING ON KLYAZMA RESERVOIR

Moscow PRAVDA in Russian 23 Jul 86 p 6

[Article by A. Kudryavtsev: "PUMA, you have a call..." with a subtitle: "Tests are Being Conducted"]

[Text] It is possible that in the near future the ambulance coordinator will use these words to authorize the next task to a crew of a new river air cushion cutter, which was created on the order of the Ministry of Health of the USSR. "Puma" is the name given to the boat by the engineers of the "Neptun" Central Design Bureau (TsKB), where many vessels for the so-called small fleet have been given life. These vessels are intended both for industrial applications and as pleasure boats.

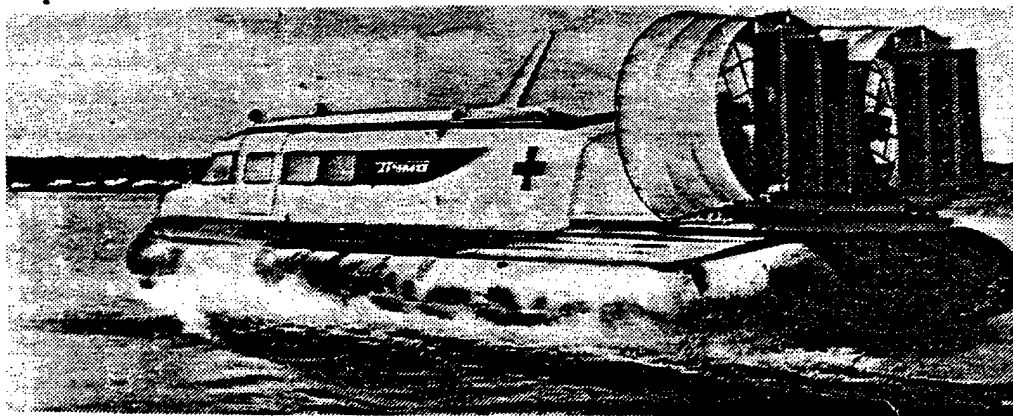
A few days ago a new cutter could be seen at the Klyazma Reservoir near Moscow, where the tests were carried out. Tens of the residents of the nearby towns and villages, vacationers, and amateur fishermen watched with surprise a strange boat with a nice-looking deckhouse of glass-reinforced plastic, reminiscent of an aircraft fuselage, which was swiftly gliding over the water surface. Upon demand, the Puma changed course with a soft roaring and, without any hesitation, moved ashore and continued travelling over the grass-covered slope in the field. After having made a loop, it returned back to the shore. Here, to the enjoyment of the kids who were staring at the boat while the "cushion," the cutter's flexible side walls, made of strong, rubberized fabric, was straining and inflating; the heavy low-set machine smoothly hovered stockstill in the air a few times at half a meter over the surface, and again "landed."

Yes, a Puma can do a lot, just like its predecessors, which, incidentally, were described in PRAVDA earlier. These are the "Gepard" and "Bars," amphibious cutters which were created earlier by the Neptun TsKB. They are both under serial construction now. Such vehicles, which are capable of travelling over water as well as over any relatively flat surface, for instance, crushed ice, snow, and swamps, are successfully standing watch in various areas of the country. They are not afraid of either shallow waters or sandy spits, which are common on the northern blue roads. During the timber rafting season, they can "hang" over timbers as easily as over water. And they also can carry on in nasty weather, sometimes helping air pilots who are forced to wait for "fair" sky.

However, many features of the Puma differ from those of the other boats comprising our "cats'" family, as we call it for fun, explained--I. Martynov, TsKB chief. Compared to its relatives, the new amphibious air cushion cutter is roomier, more efficient and has higher cargo capacity. For example, it is powered by two internal combustion engines, which propel four powerful, low-speed air propellers, which are hidden in their intake chamber. They deliver air into the flexible sidewalls of rubberized fabric. The higher the engine shaft rotation, the more noticeable is the inflating of this peculiar skirt, which clings tightly to the hull of the boat. The air cushion which is created this way lifts the boat over the surface. Simultaneously, the engines give an impulse to the large aircraft-like propulsion screws. This way the reaction jet is created which pushes the Puma ahead....

"Such a solution helped us to bring the cutter's cargo capacity up to 1,600 kilograms, added--V. Protsenko, the chief designer of the new boat. And also, to reach an average speed of 65 kilometers per hour. It is quite a speed for the regular cutters, but aboard the Puma it is almost unnoticeable, as the testing engineers and the first passengers testified. There is a bright red cross on the boat's side which is easily distinctive; this is a sign of an affiliation with the medical service. There is a spacious hall where the appropriate apparatus and equipment have been installed, including reclining chairs, oxygen cylinders, and surgical table which makes it possible to carry out simple surgical operations on board. We have created the PUMA as a re-animation ambulance cutter...."

The tests of the new boat have not been finished yet. All-round testing in the hardly accessible areas of Tomsk Oblast are going ahead. Meanwhile, the keel of the second Puma, a combined cargo-passenger version, has been assigned to the builders of the Neptun TsKB. The designers intend to install diesel engines on board modern amphibious cutters in order to improve their economic efficiency.



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## MARITIME AND RIVER FLEETS

### MORE ON GEPARD ACV PRODUCTION

Leningrad LENINGRADSKAYA PRAVDA in Russian 11 Jul 86 p 4

[Article by S. Danilin: "Flying over Waves"]

[Text] The Svir shipyard has launched the production of air cushion cutters. This new vessel named Gepard will become a reliable assistant to geologists and goldminers, fishing inspectors and forest fire-fighters.

I first saw Gepard in Nikolskoye, a small shipbuilders' village. Local kids who were riding bikes appeared well informed on the novelty: "Kolka, I am on Gepard.... Try to catch up!"

And although the cyclists were unable to describe in details the miracle-machine made by their parents, which is able to go "over water, over sand, and over ice," I should admit that I could hardly visualize it.

Here they are, the Gepards. There are two of them near the hangar, one is red and another one is green. The Gepard reminds one of a small but bulky boat with a high, like a "double," bottom. Together with G.V. Fedotov, a testing expert, we are climbing into the cabin. We sit in comfortable chairs with arm-rests. The comfort is similar to that which the "Zhiguli" owners are used to, and a large windshield provides a wide view.

Fedotov closes the watertight cabin door, which is located above, like in some sports cars, and starts the engine. The cutter starts slowly, rising while still staying in place and slightly heeling. For a moment it hovers over the sands and, after that, quickly accelerates. The Svir River is ahead.

"We'll go over water," the driver warns. I intuitively press myself into the back of the chair, expecting a jolt while crossing from land to water. But the boat almost unnoticably overcomes this barrier, and, without slowing down, jumps over the rocky ridge. Having scared the gulls, the Gepard moves sideways, surrounded by a fountain of sprays. Absolutely unexpected feelings! It might be compared only with flying in a helicopter. In the middle of the river we make a turn. Gepard hovers over the water for an instant, and again accelerates and softly moves ashore. Fedotov slows down the engine, the Gepard stops near the hangar and "sits down." S.M. Timakov, the head of the shipbuilding department greets us on shore: "What was the speed"? The testing engineer smiles and does not answer. My own estimate--about fifty kilometers.

As it turns out later, it was 70 kilometers per hour!

"And this is only over water,--Timakov continues,--When we first moved a Gepard out of the shop in February and tried it over ice, the speedometer hand stopped near the 100 mark. The fishermen who gathered on the river could not understand at first what kind of a machine it was. When the Gepard at full speed headed toward an ice-hole, they started waving hands and shouting something. It appeared later that they tried "to warn the scatter-brained driver of danger."

A Gepard can actually be mistaken for a car from a distance--its size is not very impressive. However, the "little one" is quite capable. The people at the yard are talking with enthusiasm about the possibility of using it as a kind of tractor for an air cushion train. Such machines could be useful for unloading ships at the Northern Sea Waterway, where a motorship experiences problems with docking, and sometimes cannot even approach the pier.

The production of Gepard's is a labor-consuming and complex business. Just one fact: its hull, of 340 kilograms total weight, is made of 23 various alloys. The serial production preparation of the new product has required reconstruction of the production process. A group of young workers at one production department has formed an initiative group to assemble Gepard's. Many problems have fallen upon the engineers and technicians, the material-technical supply service has encountered problems on a new scale. While fulfilling the order for Gepard's, the Svir shipyard is cooperating with many institutions and factories.

The shipyard people understand how necessary the air cushion machines are, and are taking all efforts to launch serial production sooner. The area for construction of a new production building has already been allocated. Next year the Gepard's will celebrate a house-warming--their assembly will be carried out in the new large-size shop.

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## MARITIME AND RIVER FLEETS

### YAMAL PENINSULA SHIPPING OPERATIONS, PROSPECTS

Moscow MORSKOY FLOT in Russian No 7, Jul 86 pp 40-41

[Article by Yu. Vatskikh and V. Tulyakov of the Murmansk branch of the Central Scientific Research Institute of the Maritime Fleet: "Shipments to Yamal: The Past and Prospects"]

[Text] April 1986 marks 10 years since the diesel ship "Pavel Ponomarev" guided by the nuclear-powered vessel "Lenin" delivered as an experiment 4,000 tons of cargo to Cape Kharasavey and unloaded it on shore ice. Two years later the volume of shipments to Cape Kharasavey during the winter-spring period had already reached 80,000 tons.

What has changed during the years since then? What has the experience amassed provided, and how will it be used in the future?

Such questions are especially relevant on the threshold of active development of the Yamal deposits, which has been determined by the "Basic Directions of Economic and Social Development of the USSR for 1986-1990 and for the Period to the Year 2000."

Freight shipments during the winter-spring and fall navigation periods to unequipped Arctic points with unloading on the shore ice were also carried out earlier. This was done in those cases when the shore ice at the offloading points had not broken up prior to this over the entire summer (for example, at Sedova Archipelago). Thus, in April-May 1974, cargo was delivered to Pechora Bay. Subsequently, cargo shipments by sea to this area with unloading on the shore ice became traditional. A typical characteristic of such shipments was that they were made to points with closed water areas (inlets, bays, straits, and so forth), which considerably simplified the selection of unloading sites, laying of roads on the shore ice, and ensuring safe anchorage of vessels.

The shipments to Cape Kharasavey have a number of substantial distinctions, the main one being unloading in conditions of an unprotected shore ice zone and open roadstead. The selection of vessel mooring locations and the laying of roads was accomplished in conditions of high ice hummocks, sometimes reaching 4-5 points. The possibility of the shore ice breaking off imposed increased demands on ensuring the safe anchorage of vessels, on preparing

alternate unloading sites and roads, calculating the safe distance between vessels in the shore ice, and so forth.

Nevertheless, the 10 years of experience has proven the possibility and feasibility of winter-spring voyages with unloading on shore ice, which has expanded the navigation period in the southwestern part of the Kara Sea and was a new stage in the development of navigation over the northern sea route.

Development of the Yamal Peninsula deposits will continue in the 12th Five-Year Plan. Taking into account the lack of alternative types of transport, freight delivery must be accomplished by the fleet. Cape Kharasavey should become the main point of transport operations on the western shore of the Yamal Peninsula. Given the large volume of shipments, it is quite understandable that it is unrealistic to direct efforts only to the winter or summer periods of freight delivery. Considering that the shipments will be of a relatively short duration and that their volume will decreased to 30-50,000 tons per year after the gas pipelines become operational, they must be accomplished with the minimum capital outlays. Estimates show that this is possible with an annual shipment volume of about 400,000 tons (280,000 tons during the winter-spring period with unloading on shore ice, and 130,000 tons in the summer period). As an additional reserve, up to 10 percent of the annual volume of freight is to be delivered to Marresalle.

Increasing the volume of shipments to the west coast of the Yamal Peninsula above 400,000 tons will require a further increase in capital investments. It is possible to use transport barges such as the "Sevmorput" via the route Kandalaksha--Kharasavey--Marresalle--Kandalaksha. In doing so, the volume of shipments during the summer period will be about 140,000 tons.

According to the transport-production pattern developed, including a universal system of shipments with year-round navigation and transport barge navigation in the summer period, the annual volume of freight delivery to the west coast of the Yamal Peninsula can be 650,000 tons. According to preliminary forecasts, this will meet the needs for setting up and making operational the condensed gas deposits of the west coast of the Yamal Peninsula.

The port of Kandalaksha is to be the main port of departure in the shipping scheme during the winter and summer navigation periods. It is assumed that about one-half of the planned freight shipments will be processed at this port. The remaining freight, especially in the winter period, is directed to Murmansk, and a small portion (only in the summer period) goes to Arkhangelsk.

It is impossible to increase the volume of shipments and retain the existing trend of dispatching Kharasavey freight through Arkhangelsk. Preliminary calculations show that the processing of over 100,000 tons of Kharasavey freight by the Arkhangelsk port will require considerable capital investments for dredging and construction of storage areas and additional workers as well.

A reserve for increasing the volume of shipments and also decreasing their costs is the shipment of a sand-gravel mixture by low-tonnage vessels of the Ministry of the River Fleet from points on Baydarata Bay. According to

preliminary data, this region has high prospects for deposits of gravel and crushed rock for construction.

For a reliable solution of the problem of delivering freight to the Yamal Peninsula, in the 12th Five-Year Plan it is also necessary to speed up fulfillment of the program for building air-cushion amphibious craft, construction of a storage-settling base for transport barges at Kandalaksha, and conducting dredging operations on the approach channel to the area of the Arkhangelsk port.

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## PORTS AND TRANSSHIPMENT CENTERS

### BALTIC PORT OPERATIONS, PROBLEMS, IMPORT TRAFFIC

Moscow ZHELEZNODOROZHNIY TRANSPORT in Russian No 7, Jul 86 pp 48-52

[Article by V.Ye. Ivantsov, deputy chief of the Baltic Railroad, and V.R. Kriman, deputy chief of its traffic service: "Baltic Transport Centers: By a Common Technology"]

[Excerpts] Riga—The Baltic Railroad serves Riga, Ventspils, Tallinn, Klaipeda, and Kaliningrad Maritime Commercial Ports. Foreign-trade freight accounts for over 30 percent of its mainline freight turnover. That is why the railroad's collective is improving the cooperation of transport workers in the centers. The CPSU-Central-Committee and USSR-Council-of-Ministers decree "On the Labor Cooperation of Seamen's, Railroad Workers', Truckers', and River Transport Workers' Collectives in the Leningrad Transport Center" gave powerful impetus to improvement of the work at junctions of the different forms of transport. Implementing it became the allied enterprises' most important program of actions to increase the efficiency of transport-means utilization.

### COOPERATION EXPERIENCE

During the 11th 5-Year Plan, using the acquired experience in joint operation, seamen and railroad workers continued the search for effective ways to improve management of the territorially separated transport centers located within the Baltic Republics and subordinate to the Latvian, Lithuanian, Estonian, and Baltic Shipping Companies.

A regional coordination council, which exercises control over the work of each of the five transport centers, was created under the railroad's administration in May 1982 for the purpose of coordinating the allied enterprises' work. A fundamentally new system for managing shipments, the distinctive feature of which is a continuous work schedule plan [plan-grafik] for each transport center, common and mandatory for all the allied enterprises, was set in opposition to departmental disunity.

To eliminate incipient flaws, the regional coordination council inspects the transport centers' work quarterly, directly on the spot in the appropriate shipping company or commercial port. This permits the timely solving of many problems that had seemed insoluble not so long ago. For example, the work schedules of railroad and port workers' shifts previously did not coincide,



which impaired rolling-stock utilization. During shift relief and takeover, freight cars awaiting freight operations were left uncontrolled, and prolonged interruptions in freight transshipping were permitted. This matter was taken up at a meeting of the regional council, which supported the Tallinn port workers' initiative to organize the work of unified shifts at the same time. The majority of Baltic ports now works under such a system.

In 1985, the combined loading of lightweight products and heavy freight in gondola cars was organized in the Riga and Kaliningrad Ports. Now they load steel and equipment, steel and multicars [multikary--engine-under-cab trucks of medium size], and steel and "Bastay-2" motor-vehicle trailers into one car in the Riga Maritime Commercial Port. In all, 380 cars have been freed for additional loading at the Riga-Krasta Station, which serves the port, through utilization of the efficient loading plans. About 80 cars have been saved in the Kaliningrad Maritime Commercial Port.

In separate loading of this freight, the average static load would amount to 38.36 metric tons per car; and in combined loading, the load is increased by 30.12 metric tons. The combined loading method was introduced in the Ventspils Maritime Commercial Port this year.

Organizing control over the loading of freight cars by means of the EVM [electronic computer] and introducing progressive forms of labor organization for dock workers are furthering, in many respects, an annual increase in the freight capacity of cars at the Riga Port. For example, dock workers in the Tallinn Maritime Commercial Port have mastered the allied occupation of the freight agent. This has increased responsibility for the quality of import freight being transported, led to trust and a strengthening of seamen's and railroad workers' cooperation, and eliminated personnel turnover. The fact that not a single instance of non-intact freight shipment has been permitted in the port during the last 2 years attests to the method's high effectiveness.

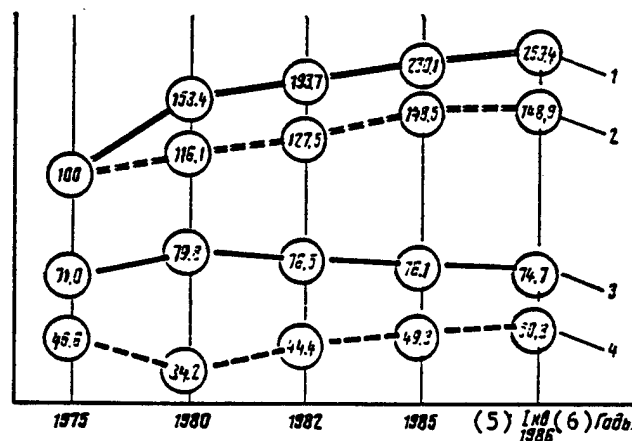
Particular attention has been devoted to organizing mutual information about the approach [arrival] of ships and railroad cars. In the Klaipeda Maritime Commercial Port, a program for transmitting information about the presence and approach of import freight in the automatic mode has been developed and introduced jointly with the railroad's computer center. Now we are introducing the program in all ports.

Steps to develop and build up the technical equipment of the port railroad stations and maritime commercial ports have been aimed at increasing the Baltic Transport Centers' work efficiency. Reconstruction of the Ventspils and Riga-Krasta Railroad Stations was completed during the years of the 11th 5-Year Plan, and development of the Kaliningrad-Sortirovochnyy [Kaliningrad-Marshaling Yard] Station continues, as well as the equipping of port railroad stations with systems for the electrical centralization of switches and signals [centralized traffic control (CTC)]. The port equipment of Riga, Ventspils, Klaipeda, and other ports has received further development. Construction of the Novo-Tallinn [New Tallinn] Port and the Klaipeda-(Mukran) Ferry Crossing, which will connect the USSR and the GDR, is being carried out for the purpose of increasing the carriages of foreign-trade freight.

In connection with augmentation of the railroad stations' and maritime ports' technical equipment, the common technological processes were adjusted, and the centers' agreements revised. This also provides for speeding up the accomplishment of maneuvering and freight operations.

Introducing a common, coordinated technology for the transport centers' work and strengthening the cooperation of railroad and port workers are producing excellent end results in increasing the utilization efficiency of transport means. For example, the volume of foreign-trade freight transshipment had grown by 38.5 percent in 1985, as compared with the 1980 level. In the process, freight-car idle time during freight operations in the ports had been reduced by 2.09 hours. Transshipment of import freight by the direct mode had reached 76 percent in 1985, and 93 percent of the ships were processed ahead of schedule and on schedule. Beginning in July 1985, the loading plan for import freight as a whole has been successfully fulfilled in all of the region's ports. Removal of this freight from the ports according to established plans for the first quarter of the current year was ensured.

Baltic seamen and railroad workers are actively drawing industrial and motor-transport enterprises into the labor-cooperation orbit, and extensively introducing the Leningrad transport workers' experience in all elements of the transport process. Thanks to cooperation, the idle standing of freight cars on the approach tracks has been reduced by 0.64 hour in comparison with 1980, and the productivity of motor transport engaged in centralized carriages has increased by 10 percent. In 1985, over 350,000 metric tons of perishable goods were removed from the maritime ports by refrigerated trucks, which permitted freeing over 1,000 freight cars for their long-distance carriage.



Basic Work Indices for Baltic Transport Centers in Percentages

Key:

1. Import-freight loading in maritime ports
2. Freight processing in maritime ports
3. Import-freight processing by direct mode
4. Through-train loading of import freight
5. First quarter 1986
6. Years

Extensive dissemination of the Leningrad Transport Center's experience has permitted substantially improving the work indices of the railroad, the ports, and the shipping company. Growth by 20.2 percent was achieved in freight shipping during the 11th 5-Year Plan without enlarging the working freight-car fleet. Freight turnover was accelerated by 0.14 twenty-four-hour day in the process.

#### URGENT PROBLEMS

To improve the ports' and port railroad stations' work further, it is necessary to solve a number of problems that, in our opinion, are of interest to the collectives of the other transport centers as well. Import freight carriages are regulated, as you know, by "Basic Conditions for Accepting and Releasing Export and Import Freight at Railroad Stations and in Maritime Commercial Ports." However, this standard document became effective back in 1958, and certain of its provisions have become outdated and do not correspond to present-day requirements. For example, the loading of import freight into freight cars by the ports' forces and means is envisaged. At the same time, control over the serviceability of the freight pieces' packaging and the correspondence of the number of pieces to the number indicated by the port in the shipping documents, as well as operations to seal the freight cars loaded by the port, are assigned to the railroad. And this is at variance with article 55 of Regulations for USSR Railroads.

As a result, the railroad is compelled to keep a large number of its own agents, who essentially duplicate the work of the port freight agents and the tallymen, at the port railroad stations. And this, in practice, leads to release from personal responsibility, inasmuch as the port's freight agent and the ship's tallyman also are present during freight loading, in addition to the railroad's representative; and, during transshipment of such freight as meat, butter, and other food products, an agent of the Goods Superintendence Office [Byuro tovarnykh ekspertiz] is present as well.

In case of shortage or damage suffered during loading, all responsibility is placed upon the railroad. However, freight shortage and damage cannot always be discovered during freight transfer, since the loading is done by port resources. At present, in work by the most efficient direct mode, "ship side to freight car," using machines, 50 to 120 pieces of freight are unloaded from a ship during one lift. Therefore, piece-by-piece counting, and checking on the serviceability of each piece's packaging are impossible. At the same time, the ports' workers, knowing full well that the ports will be freed of responsibility for freight shortage or damage discovered behind a port railroad station's seals, make no attempt to discover freight shortage or damage during transfer.

In our view, it is advisable to extend the action of article 55 of Regulations for USSR Railroads (freight car sealing by port means) to the ports, or create a special, disinterested organization, based on the Goods Superintendence Office, which will bring about the loading and unloading of import freight. This will permit sharply increasing freight intactness and freeing 150 persons, just for our railroad, without detriment to the work on import freight transshipment in the ports. This is especially important now, when the railroad is shifting to work by the Belorussian Railroad method.

The existing planning system for import freight carriages differs sharply from effective requirements for the national-economy ministries and departments. The railroad's administration receives a joint loading plan for import freight from the USSR Ministry of Railways and Ministry of the Maritime Fleet, with indication of the numbers of tons of freight and loaded freight cars only. The absence of kind of rolling stock from the plan by destinations hinders development of the technical plan's standards and, in the process of its execution, causes serious deficiencies in provision of the loading. A loading plan by destinations, tentatively established according to an achieved level, actually is carried out with 60 to 80 percent deviation, and the loading in certain planned directions actually is not carried out at all. Practice shows that the ports always have substantial remainders of freight included in orders, and especially of pipes, metal, and grains, on the first day of each month, and know the destinations and terms of their carriage. For these amounts, as well as for subsequent ship arrivals, the depth of information on which has increased considerably in recent years, the ports can present plans with the necessary details, which will make it possible to increase the reliability of the plan by destination railroads to 80-90 percent.

In accordance with section 22 of Basic Conditions, a maritime port pays a fine to the railroad, in the amount of 20 kopeks per hour of delay, for delaying freight cars in loading and unloading beyond the periods established by transport center agreement, as well as for delaying the acceptance of loaded freight cars. At the same time, according to article 118 of Regulations for Railroads, the shipping company, the port, and the docks pay a fine of 40 kopeks per hour for ordinary freight cars for delaying freight cars in loading and unloading beyond the periods established by transport center agreement, as well as for delaying the acceptance of loaded freight cars arriving at a transshipment station. When delaying tank cars, cement carriers, transporters, hopper cars, and other special freight cars (except refrigerator cars), the amount of the fine is doubled; and when delaying refrigerator cars, it is tripled. The railroad's administration tried to exact the fine from the ports for the additional idle standing of freight cars, but the Gosarbitrazh [State Board of Arbitration] rejected the suit. Moreover, the railroad pays a fine in the amount of 40 kopeks per 24-hour day to a port for each ton of cargo not transshipped from a vessel because of a failure to provide freight cars in the number indicated in a daily port order which has been coordinated in accordance with the transport center agreement.

As a result, unequal responsibility of railroad and port workers for the idle standing of transport means is created. In our opinion, it is necessary to increase the ports' responsibility for above-norm idle standing of freight cars, extending the action of article 118 or article 156 of Regulations for Railroads to them.

Weighing equipment has become a "bottleneck" lately in port and railroad workers' work. The freight-car scales in all the ports have become antiquated, do not provide the necessary weighing accuracy, and impede the acceleration of ship and freight car processing. The need to install scales equipped with metering devices has become critical. This will permit not only rapidly and accurately weighing freight, but utilizing the cars' freight capacity to the maximum extent as well.

During recent years, the losses that the railroad suffers from non-intact shipments have increased unjustifiably because of changing the long-standing practice of applying leftover import freight, being shipped from the maritime ports, to the coverage of shortages. Formerly, upon receipt of the railroads' commercial vouchers as to shortages and excesses in freight cars under the unbroken seals of port railroad stations for a single ship lot, a port used to make out a correcting notification and send it to the appropriate foreign trade association, which would present a bill to the consignee for the freight actually received. The procedure of section 9 of Basic Conditions was adopted on the basis of these considerations, and calls for the forwarding, on railroad instructions, of the extra pieces of packaged [tarno-upakovochnyye] and by-the-piece [shtuchnyye] import freight found in a port after the shipping of an entire lot according to every bill of lading to cover shortages at destination points certified by commercial vouchers upon unloading from freight cars that arrived under the unbroken seals of port railroad stations. However, because most import freight is being shipped by the "ship side to freight car" mode at the present time, the extra freight is found, not in the ports, but in the consignees' possession.

Now, the railroad pays the consignees' claims for shortage of freight in freight cars under the unbroken seals of port railroad stations, while for its excesses, certified by commercial vouchers, a consignee transfers sums of money to the appropriate foreign trade organizations. Inasmuch as the freight actually has not been lost in the transport process, discontinuing the former procedure cannot be considered well-founded. It would prevent the unjustified growth of losses from non-intact shipments.

Serious difficulties arise in the work of port railroad stations and ports upon the arrival of import freight in damaged and untransportable packaging [tara]. The wording of section 8 of Basic Conditions is extremely generalized on packaging and packing [upakovka], to wit: "Import freight is presented for transport in the packaging (packing) in which it arrived in port if this packaging (packing) provides for the freight's intactness during transport on the railroads." However, no standard documents of any kind prescribe conditions for the packaging and packing of import freight which provide for its intactness during transport on the railroads, much less for long distances.

Moreover, the Chambers of Commerce and Industry's experts at import-freight output stations do not show the cause of the freight loss, spoilage, and damage which depend upon the packaging and packing because of the lack of conditions for these and the impossibility of determining conformance to a standard. Since there is no definitive document, all the consequences are charged to the railroads, on the basis of section 12 of the aforementioned Conditions, for shortages and damages arising because of poor packaging and packing, intra-package placement, and fastening.

Our region's port and railroad workers are seeking ways for the fullest utilization of freight cars' load capacity when loading import freight. However, here, too, there exist large reserves. Foreign trade organizations frequently

place orders below the freight cars' load norms, or without considering these at all. For example, on 12 April 1985, the association "Eksportles" ["All-Union Association for the Export and Import of Timber, Woodpulp-Paper Goods, Prefabricated Wooden Houses, Cork and Plastic Articles"] gave the Tallinn Office of the "Soyuzvneshttrans" ["All-Union Foreign Trade Transport Association"] an order for shipment of label paper from motor ship F. Rozin as follows: with destination Kursk--45 metric tons, Sverdlovsk--48, Voronezh--40, Moscow--40, Khorlovo--51, Cherepovets--50, and Gomel--48 metric tons. There are quite a few such examples. Often, when shipping imported metal, the Soyuzglavmetall [Main Administration for Supply and Sale of Metal Products (under the USSR Gosstab)] places orders for 68, and no more than 70, metric tons addressed to one consignee. Meanwhile, the local technical norms for loading freight cars with imported metal have been revised and increased to 75 metric tons on the Baltic Railroad. A similar situation occurs as well in transporting other import freight. This all rules out full utilization of freight cars' load and volume capacities in shipping import freight. It is necessary to arrange the placing of orders for transporting import freight with consideration of the technical norms for loading freight cars.

It is well known that the maritime ports bear responsibility, in accordance with effective regulations, for the idle standing of freight cars carrying export freight that are not unloaded in covering fulfillment of the established average daily quota. Data indicate that actual unloading in the maritime commercial ports exceeded the quota by 14 percent in January 1986 and 5.3 percent in March. Meanwhile, the daily backlogs of freight cars in unloading amounted to 228 and 170 freight cars respectively. Having fulfilled the unloading quota, the ports are freed of responsibility for the freight cars remaining to be unloaded. However, it is an established fact that the maritime commercial ports have considerably greater unloading capacities than the quotas. Apparently the time has come to revise section 76 of Rules for Planning Freight Shipments by USSR Railroads, promulgated in 1972, which establishes the ports' responsibility only for the unloading quota. The ports' responsibility for amounts of unloading should be determined based upon turnover time or the conditions for freight cars' presentation at, and removal from, the unloading areas.

In our view, it is essential to regulate the organization of perishable freight shipments through maritime commercial ports. It cannot be considered normal that these often coincide with massive shipments of vegetables, early cabbage for example, within the country. This leads to additional idle standing of ships in the ports, and to substantial losses. These losses might be reduced to a certain extent, given the availability of port refrigerators. However, there are practically none of these. Therefore, the transshipping of perishable freight is carried out only by the direct mode.

The unloading of gondola cars carrying bulk export freight can be expedited by constructing elevated tracks. Using grab cranes not only fails to make it possible to ensure high-quality emptying of the rolling stock, but leads to its damaging as well. It is not by chance that the greatest amount of damage to gondola cars is sustained precisely in the maritime ports. Solving the indicated problems will permit substantially expediting the processing of ships and railroad cars in the ports.

The need has become urgent to establish a common data-base computer system which would, in real time, on the basis of data about ship arrivals, permit increasing the forecasting depth for bringing up freight cars and assigning appropriate quotas to the loading stations, ensuring the monitoring of rolling-stock movement from loading point to port of destination, etc. Even now, all maritime commercial ports and oil transshipment bases have computer centers. The port railroad stations are linked with the railroad's computer center, which, in turn, has access to the Main Computer Center of the MPS [Ministry of Railways]. Nevertheless, each center solves its own local problems without mutual coordination.

Common indices are needed for the work conditions and socialist competition of railroad-station and port collectives. The work of the railroad stations' and maritime commercial ports' collectives, performing the same task within the make-up of a united transport center, is evaluated differently. This leads to a situation in which port collectives often come out the winners in the All-Union Socialist Competition, while the labor of port-railroad-station workers does not receive such a high evaluation.

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PORTS AND TRANSSHIPMENT CENTERS

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NOVOROSSIYSK PORT OPERATIONS, PROBLEMS, GRAIN TRAFFIC

Moscow ZHELEZNODOROZHNIY TRANSPORT in Russian No 7, Jul 86 pp 40-43

[Article by F.M. Kotlyarenko, chief of the North Caucasus Railroad; V.D. Pavlenko, chief of the Novorossiysk Maritime Shipping Company; and O.N. Serebryakov, candidate of technical sciences: "The Novorossiysk Transport Center: Business Cooperation"]

[Excerpts] Rostov on the Don—Novorossiysk — The Basic Directions of the USSR Economic and Social Development, approved by the 27th CPSU Congress, foresees substantial growth in the volume of carriages by all forms of transport. For the North Caucasus Railroad, on which are located the major maritime commercial ports of Novorossiysk, Tuapse, Makhachkala, and Taganrog with considerable freight turnover, carrying out this task has paramount importance. That is why the involved enterprises are directing their efforts toward further improving cooperation in the transport centers and improving work coordination in transport-process organizations.

Work indices convincingly attest to the labor-activity effectiveness of the allied collectives. The amounts of import shipping grew by 36.3 percent in the 11th 5-Year Plan (grain by 47.2 percent, sugar by 54.2 percent). The volume of export carriages was increased substantially. Despite the growth of the carriages, their quality was improved. Increase in freight car turnover was accompanied by reduction in the idle standing of freight cars in the same freight operation in port. The port collective fulfilled the assigned quota for idle standing of freight cars annually, and, having reduced it by 0.63 hour compared to the 10th 5-Year Plan, achieved a saving of about a million freight-car-hours. This permitted additionally obtaining 35,000 freight cars of loading resources. The actual average idle time of freight cars in the port was reduced by 1.39 hours as compared to the established norm. [This paragraph concerns the Novorossiysk Transport Center]

Particular attention is devoted to constant improvement in the sizes and forms of shipper's through-train assembly at the Novorossiysk Transport Center. At present, about 90 percent of the freight cars are sent out in through trains. The number of long-distance through trains has grown. Every other through train travels a distance of 1,000 kilometers or farther. At the Novorossiysk Station, they use formation of shipper's through trains extensively, taking into account the location of destination stations on separate sections. This method is used especially often when dispatching freight cars carrying sugar.



Groups of freight cars in the composition of the through trains being formed are arranged in such a way as to avoid additional maneuvering work at the stations where the sugar plants [mills] are located. After unloading, the empty freight cars are assembled into a fully formed train and sent to the appropriate freight areas of the Novorossiysk Maritime Commercial Port's docks [piers, wharfs or quays] without washing and the weighing of dunnage [tara]. As a result, the turnover of coupled, through sugar trains on the railroad has been shortened by 2 twenty-four-hour days. Approximately the same scheme of through-train assembly is used in shipping imported grain, taking into account the unloading capacities of the North Caucasus Economic Region's elevators and balanced livestock-feed plants [mills]. This permits utilizing rolling stock the most intensively, and increasing the volumes of freight removal from the port.

Utilization of freight car capacities has been improved substantially. On the average, 1,820 kilograms more was loaded into each freight car in 1985. Static loading grew by more than 2 metric tons during the years of the last 5-year plan. In 1985, over 3,000 freight cars were saved in the port through improving the utilization of freight cars' weight and volumetric capacities. Along with this, freight storage periods in the port were reduced, and freight intactness increased.

The comprehensive steps taken to augment the railroad station's and the port's material and technical base, improve the technology, and introduce a system of continuous, coordinated planning promoted increase in the allied enterprises' work efficiency in many ways. During recent years, substantial amounts of funds have been invested in development of the railroad station's and port's physical plants. At the railroad station, the access tracks [gorloviny] of yard "A" and the odd-numbered access track of the "Nizhniy" ["Lower"] yard were rebuilt, and new tracks were laid in the "Verkhniy" ["Upper"] yard. The car shop's repair base was built up, additional repair tracks were allocated in yard "A", and construction of a new classification [marshaling] yard was begun.

In 1984, a specialized area was activated for processing large-tonnage containers of 20- and 30-metric-ton gross weight. This permitted eliminating manual labor in the station's freight yard and reducing the expenses of freight shippers and consignees. Simultaneously with this, the problem of remedying the commercial and technical defects of incoming large-tonnage containers holding export freight was solved, and the turnover of these to the port expedited.

In the port, the Vostochnyy [Eastern] Region's track development was reconstructed; an additional track was built for processing freight cars at deep-water dock No 5, and powerful "Khartman" ["Hartman"] Firm grain transshipment loaders [zernoperegruzhateli] were installed, permitting 1.5-fold increase in the dock's handling capacity; and the freight transfer equipment of docks Nos 10 and 18 was replaced with more powerful equipment. New grain transshipment systems [zernoperegruzochnyye komplekсы] for transferring grain from ships to

the elevator by conveyers were installed on dock No 22. This permitted organizing freight processing by the "ship-conveyer gallery-elevator-freight car" scheme. A dock for handling the large-load containers and mechanical equipment on ships of the "RO-RO" ["roll on-roll off"] type was brought into operation, and the railroad tracks in the port's Central Region were capitally repaired.

Along with augmenting the railroad station's and port's material and technical base, the allied enterprises' physical plant also is being developed. For example, the Krasnodar Kray Grain Products Administration's Novorossiysk Elevator built a new overhead conveyer line for taking grain from maritime ships directly to the elevator. The "Importpishcheprom" ["Food Industry Imports"] Association reconstructed the old flow line for receiving vegetable oils.

At the allied enterprises' center of attention--further improving the railroad station's and port's work technology, according to the Leningrad transport workers' method, on the basis of continuous planning. Steps were worked out, on the initiative of the port's railroad and port workers, to introduce a continuous transport-center work schedule plan (NPGRTU). Preparatory work was carried out in accordance with these in the port, at the railroad station, and on the railroad's Krasnodar Branch. The necessary telegraphic data communication channels were allocated for transmitting the data. The technology for supplying the port with information on the departure of loaded and empty freight cars for the NPGRTU's formation was developed in the railroad's administration.

Introducing a common technology required combining the railroad workers' and seamen's technical resources. The railroad ensured development of the communication channels, and organized the transmission of information on the approach [arrival] of empty and loaded freight cars. The data processing is done in the maritime port's data-base computer center.

The NPGRTU's planning depth is 10 days. Information enters the system daily on maritime ship arrivals and empty and loaded freight car presentations in the port, on the basis of which a new schedule plan is calculated for a 10-day period. This ensures the 10-day schedule plan's continuity and planning accuracy.

Information on the movement of empty and loaded freight cars arrives at the port between 0800 and 0830. The NPGRTU calculated by the port's VTs [computer center] EVM [computer] is transmitted daily by teletype [teleprinter] to the Novorossiysk Railroad Station and the railroad's branch and administration during the period from 1300 to 1330. After correction, the schedule plan becomes effective as of 1800 on the ongoing 24-hour day.

New ways to improve the work technology of the allied forms of transport make their appearance in proportion to the development of technical resources. Introducing the automated classification [marshaling] station control system at Bataysk and Mineralnyye Vody and the ASOUP [not further identified] permitted

obtaining information on the arrival of loaded freight cars directly from the computer. Now, the allied enterprises are solving the problem of intermachine information exchange in the automatic mode between the port's and railroad's computers. Teletype communication has been introduced, and is in operation, at the Bataysk Railroad Station for transmitting timely information addressed to the Novorossiysk and Tuapse Maritime Ports.

The work experience on the basis of continuous planning shows the effectiveness of this system. Idle standing of maritime ships and railroad cars while awaiting freight operations has been reduced, and the volume of freight processed by the direct mode has been increased.

In developing the work technology for the allied enterprises at the transport center, it was necessary to solve a large number of technical, organizational, and economic problems. Work in cooperation with the All-Union Railroad Transport Scientific Research Institute's scientists is being done to improve the port railroad station's work technology on the basis of extensive use of computer equipment. Methods of supplying the port with reliable information on the arrival of empty and loaded freight cars have been worked out, and the problems of optimum freight delivery to the ports have been solved.

The problem of ensuring timely pickup of imported vegetable oils in the port has been solved creatively on the strength of the available material and technical base. It was proposed to use the USSR Minpishcheprom [Ministry of the Food Industry] wine exporting and importing base's old flow line when pump-transshipping oils. The line's reconstruction was accomplished in 2 weeks.

The new technology of picking up imported grain by the "ship-conveyer gallery-elevator-freight car" scheme produces a great effect. Now, grain shipping is accomplished by a covered gallery equipped with powerful conveyers, which connects the dock with the elevator. An additional reserve for reducing the idle standing of ships and freight cars has made its appearance.

Many other technological findings have been developed and introduced into the allied enterprises' practical activity. These are organizing the maneuvering work with single freight cars using loader trucks equipped with automatic coupling systems, using grain boards [shchity] of greater height during grain carriages, making up through trains for grain and sugar carriages, taking the location of stations on the sections into account, constant revision of rolling stock's technical norms for loading with import freight in the direction of an increase, etc.

The integrated socialist competition of railroad workers, port workers and ships' crews has become one of the decisive factors in the matter of expediting the processing of ships and freight cars, intensifying freight work, and increased provision of empty freight cars to the port's regions. During the final year of the 11th 5-Year Plan alone, 243 ships were processed by integrated contracts. This permitted reducing idle times by almost 8,000 ship-hours.

The allied enterprises' socialist competition made it possible to improve the utilization of fixed production capital. Thus, the yield on capital rose by 8 percent at the Novorossiysk Railroad Station, and by 2 percent in the maritime commercial port, during the years of the last 5-year plan. The railroad station workers' labor productivity grew by 10.6 percent.

Despite what has been achieved, the transport center's railroad workers and seamen have quite a lot to do in order to meet the planned quotas in freight shipments. A precise rhythm should be achieved for delivering empty freight cars, the schedule of ship arrivals should be observed strictly, especially for ships with perishable cargoes, and rolling stock should be brought up for loading in good condition. There exist many reserves for further improving the joint technology.

It is necessary to solve certain problems in order to increase further the co-operation effectiveness of Novorossiysk's railroad and port workers. At present, shipping volumes still are insufficient for freight in universal containers, and especially the large-load ones. This has to do, first of all, with the transferring of valuable freight into containers. It is essential that the Ministry of Foreign Trade oblige foreign trade associations and customers to treat freight-car and containerized shipments as equal in price.

In our view, it is necessary to change the Novorossiysk Maritime Commercial Port's specialization. Such mighty economic regions of the country as Central Asia, the Volga Area [Povolzhye], Transcaucasia, and the North Caucasus are drawn toward this center. Assigning these regions of the country to the Novorossiysk Transport Center will shorten the container route substantially.

One of the problems is associated with departmental development of packaged shipments. Standard package sizes do not correspond to, and are not evenly divisible into, the dimensions of freight cars, which does not provide for an increase in static loading. Commercial workers do not accept a freight car loaded by combined package and customary methods. The requirements for a package described in part 1 of Rules for Shipments and the standard maritime documents are not the same. This often leads to the breaking up of packages in transshipping. Moreover, the packaging level of export freight being shipped in bags is inadequate. This increases the idle standing of freight cars in freight operations, and hinders transition to mechanized processing. There are no interdepartmental decisions on the work procedure with import freight put together in packages of various countries' traditional types and forms.

The Novorossiysk Center's work can be improved through increasing the carriages of freight, especially food freight, by motor transport. During an acute rolling stock shortage, the local UTEP [not further identified] agencies do not fulfill the shipping plans. Consignees and customers, in a number of instances, do not wish to make payment according to the increased, by comparison with the railroad, truck rate, and are agreeable to receiving the goods later, but by railroad. This leads to prolonged storage of freight in port warehouses and additional delays.

Apparently it is necessary to review the matter of planning the shipping and carriage of small lots of leftover import freight, especially metal and metal products. At present, over a month passes from the moment of such remnants' appearance until their departure by small shipment. In view of the fact that the port cannot foresee their appearance, it would seem advisable to assign such freight to the category of that envisaged by section 99 of Regulations for USSR Railroads as being carried by small shipments from transshipment points, where it is accepted in the mixed means of transport upon presentation.

For further increasing freight cars' static loading and increasing the efficiency of carriages, it is necessary to revise the GOST's [All-Union State Standards] for grain boards [shchity] to the extent of increasing the latter's height. This will ensure the intactness of grain freight. Inasmuch as the loading of boxcars with granular freight is effected in the ports through the roof hatches, it is essential to have vibrators of special design to even out the freight.

Increasing the processing volumes of grain, sugar, and other granular freight, the weight of which is determined on freight-car scales, requires accelerating the weighing process with a means of recording weight indications directly on the shipping documents. This will eliminate errors in readout and expedite freight car turnover. During the transition to automatic scales, electronic attachments can provide for this. In our view, it is necessary to make changes in Rules for Shipments, taking into account the possibility of using electronic scales on the "Khartman" ["Hartman"] firm grain-transshipment loaders.

At present, the weighing of valuable food freight during transshipment is done at the ship's side on the existing freight scales. This does not provide for weighing accuracy, and depends upon weather conditions in many instances, which, in the final analysis, leads not only to the misrepresentation of actual weight, but also to significant idle standing of transport means. It is necessary to weigh the freight at the consignees' establishments. The practical experience of many years shows that the difference between the bill-of-lading and actual weight of freight is insignificant.

In our opinion, the USSR Ministry of Foreign Trade should discontinue the delivery to a port of export goods not covered by advance sale agreements. This will reduce their storage time in the warehouses, further the expediting of freight car unloading, and, most importantly, preclude ill-advised shipments. Over 6,000 metric tons of originally delivered export goods were returned from the port to the supplier plants in 1985 alone.

It is advisable to ship most imported grain by water. The railroad carried over 250,000 metric tons of imported grain to Volga [Povolzhye] regions, parallel to the waterways, just in the period from April through September 1985. In our view, it is necessary to consider two alternatives. In the first, transport the grain from the port to the Volga regions by the "sea-river" mode, with direct grain transshipment from maritime ships into ships of the "sea-river" type. The cost of such carriages is lower than direct railroad carriages. This will produce a substantial saving of transport expenses, and permit reducing the idle standing of maritime ships in the port.

The carriage of grain also may be organized by the "sea-railroad-river" mode: Transport the grain from Novorossiysk by specialized railroad rolling stock--grain carriers--to Yeysk, where its transshipment then is effected into ships of the Volga-Don River Shipping Company, the executives of which support our initiative. However, the Krasnodar Kray Grain Products Administration's executives oppose this alternative. They cite the storage incompatibility of the Kuban grain varieties with the imported. The same opposition as in Krasnodar Kray was eliminated at the Novorossiysk Elevator through the complete isolation of the domestic grain from the imported in the storage bins. Such work can be carried out at the Yeysk Elevator as well.

Deciding the posed questions is a complicated and many-sided problem. Still, however, much might be decided if the interested parties' efforts were coordinated at the level of the ministries and departments. Practical reality urgently demands a new approach to solving these most important problems.

Having entered into the 12th 5-Year Plan, the Novorossiysk Transport Center's collectives have accepted increased joint obligations for freight carriages and the intensification of rolling stock utilization. Fulfillment of these will permit ensuring the region's high quality of transport service.

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PORTS AND TRANSSHIPMENT CENTERS

BRIEFS

VAZHINY RIVER PORT OPERATIONAL--Podporozhye (Leningrad Oblast)--The first large-tonnage ships have left the docks [wharfs, quays, or piers] of the new port of Vazhiny, in Leningrad Oblast, which has begun to operate on the Svir River. The opening of this harbor's first section [increment] will make it possible to take the strain off the fully loaded railroad arteries, having switched part of the freight traffic to the waterways. Putting the port into operation, equipped with cranes of original design and a branching network of approach routes, was envisaged by the program for intensifying the transport system between the country's northwestern and central regions. [Text] [Moscow SELSKAYA ZHIZN in Russian 15 Aug 86 p 1] 12319

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## INTERSECTOR NETWORK DEVELOPMENT

### COMMISSION REVIEWS 12TH FYP TRANSPORT DEVELOPMENT

Moscow IZVESTIYA in Russian 10 Jun 86 p 3

[Article by IZVESTIA special correspondent Yu. Grinko: "Speed, Comfort: Meeting of Preparatory Commission on Transport and Communications"]

[Text] The Joint Deputies' Preparatory Commissions, made up from standing commissions of the Council of the Union and the Council of Nationalities of the USSR Council of Ministers conducted a preliminary examination of the draft for the State Plan for Economic and Social Development of the USSR for the Years 1986-1990. Today we will tell you about the meeting of the Preparatory Commission on Transport and Communications, chaired by N. V. Cherskiy, Hero of Socialist Labor and Chairman of the Presidium of the Yakutsk Branch of the Siberian Department of the USSR Academy of Sciences.

Having heard the reports of Gosplan USSR and GKNT [All-Union State Committee of the USSR Council of Ministers on Science and Technology], communications from the transport ministries and the USSR Ministry of Communications, the members of the Preparatory Commission noted with satisfaction that all types of transport and communications were further developed. Ahead lies the 12th Five-Year Plan. During the course of the Plan, it remains to make a significant contribution to accelerating the country's socioeconomic development. Therefore the delegates concentrated their attention on a business-like, constructive evaluation of the plan's indicators, the direction of which was determined by decisions of the 27th CPSU Party Congress.

A wide range of questions fell under the delegates' purview: total incorporation of production potential, capital construction, development of the social infrastructure, insuring a uniform distribution of quotas throughout all years of the five-year plan. However, if you will, their interest was mostly concentrated on how measures to accelerate scientific and technical progress are reflected in the draft of the Plan. And this is understandable: without having insured a new level of transport and communications from a qualitative standpoint, it is difficult to achieve an intensification in the national economy.



The draft of the Five-Year Plan calls for the relative importance of rail transport remaining the greatest within the overall freight turnover. In other words, the steel highways will retain the decisive role in providing communications among economic regions and within them. Under these conditions, the delegates emphasized, it is particularly important to insure accelerated re-equipping and renovation of existing production. Increasing the weight and length of freight trains, static car load, conversion to roller bearings, increasing containerized and packet freight shipment, increasing the proportion of specialized cars within the total car inventory and total mechanization of loading and unloading operations are the chief reserves for growth in the operation of the steel highways. Of course, one cannot get by without corresponding material and financial costs. Moreover, the delegates noted, the draft of the Plan is not beyond reproach on all these items.

"In the next 5 years, we have to build 4,000 kilometers of secondary track and 2,700 kilometers of new and to electrify 8,000 kilometers of railroad. This will take up the greatest part of the funds allocated to us," says N. S. Konarev, USSR Minister of Railways. "And for maintenance of railroad facilities, which already takes tens of billions of rubles, expressed in terms of cost, they are planning for an amount which is even less than that for the last five-year plan. Is that logical?"

The deputies also point out the following circumstances: delivery of rail cars and electric locomotive cars is planned at a level of only about one-third of the demand for them.

The Preparatory Commission will again carefully examine the possibility of allocating funds for needs for the industry's development. Progress, of course, costs money.....

It is planned that shipments by sea transport will be increased by a factor greater than 1.5 during the new five-year plan. They are betting here on utilization of advanced technologies and the skillful use of ships of various types (container ships, 'rolkers' [meaning unknown], lighter tugs, etc.). In forming the primary funds for port services, they are setting a course on construction of highly productive complexes. Moreover, a well-founded fear was expressed at the commission's session concerning the fact that measures taken to augment the fleet have not been drastic enough. As their service life nears its end, it will be necessary to write off tonnage of several million during the 12th Five-Year Plan. To delay in this will mean to operate with obsolete equipment, which will require great repair expenses.

What is seen as the solution? Updating the fleet is not a problem which can be solved in a single day, or even in a single year. It is all the more important, the delegates said, to be constantly upgrading the quality of equipment operation, to strive to increase periods between repairs, to improve the administrative structure and to utilize advanced know-how since it is there.

In the area of civil aviation, the Plan's draft calls for increasing passenger traffic by a factor of 5.7 using economical Il-86, Yak-42 and Tu-154M aircraft. The share of the work of these liners in passenger turnover will increase to

35 percent, and this will result in a savings of several hundred thousand tons of aviation fuel during the five-year plan. It is also being planned to put airport complexes into service in Baku and Minsk, to begin construction on airports in the ports of Domodedovo, Petropavlovsk-Kamchatskiy, Khabarovsk, Blagoveshchensk, Tyumen and Simferopol and to build 28 hard-surfaced runways.

During the course of the Preparatory Commission's discussion of the draft for the Plan, attention was turned to the fact that a new indicator has been introduced for aviators which characterizes the industry's technical level: "The share of passenger turnover carried on aircraft with specific fuel consumption of up to 40 grams per passenger-kilometer." It would seem that significant growth in the technical level is being planned for the five-year period. But this depends on what is being compared. It was reported at the session that 80 percent of passenger traffic carried on foreign airlines is already being carried at this level. This is significantly greater than in the Soviet Union. It does not do to lag behind, and that means, said the delegates, that it is necessary to replace fixed production capital more actively, once having set progressive equipment service lives. This work is going on, but more slowly than it should be.

Growth of freight shipment by public motor vehicle transport is being called for, along with further development of centralized shipments and an improvement in service to enterprises and organizations. The number of buses and taxicabs will grow significantly by the end of the five-year plan. It is planned to increase the number of motor vehicles for individual use from 44 per 1000 persons in 1985 to 55 per 1000 in 1990.

The basic trends call for construction of 167,000 kilometers of hard-surfaced highways in the years 1986-1990, of which 75,000 kilometers will be for public use. These include several tens of thousands of kilometers of road which must be laid in accordance with the decree of the CPSU Central Committee and the USSR Council of Ministers, "Additional Measures for Development of the RSFSR's Public Highway Network." Construction and renovation of the indicated roads is specified at the expense of limits in state capital investments and beyond the limits, insuring the needs for material and technical resources in a centralized order. The wish was expressed at the Preparatory Commission session to make the Plan draft more specific in the area of central supply for super-highway construction.

The state Plan's indicator for communications was also examined in depth and with attention to content. The planned growth in the length of telephone channels on inter-city telephone lines, the increase in the capacity of telephone stations in cities and villages, construction of new complex mechanized postal communications facilities and television stations -- each of these items was subjected to detailed analysis. The delegates emphasized the necessity of accelerating production of domestic electronic ATS [automated telephone stations] provide series production of quasi-electronic "Kvarts" type urban ATS and "Kvant" type rural ATS. Examples were presented of how slowly the USSR Ministry of Communications is replacing obsolete equipment with new. It was pointed out that much of the blame for this can be placed on related areas, e.g. the Ministry of the Communications Equipment Industry, Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems] and the Ministry

of the Radio Industry. The thought was expressed that apparently the time had come for these departments to set up among themselves specialized subindustries so that communications workers can depend on concrete partners, solving the problems of the development of the industry in a qualified and operative manner.

The state Plan is law. Each word in it, each figure should be absolutely accurate, absolutely verified and conform completely to actual possibilities. This is all the more important in that we are speaking about those areas of the economy which directly affect each person. Therefore the delegates probed the essence of each problem with great interest and with a sense of high responsibility.

While attending the session of the Preparatory Commission, one understands particularly clearly that our plans and programs for the future are not the fruits of cabinet-level estimates; they are based on the experience and capabilities of labor collectives, our best specialists and practitioners. There are many of them on the Preparatory Commission on Transport and Communications. Along with visible party and state workers are Nikolay Aleksandrovich Vitashkevich, an electric locomotive engineer from the Orshansk locomotive depot on the Belorussian Railroad, Anatoliy Sergeyevich Kaledin, captain of an Il-86 airliner from the Vnukovo production association, Vladimir Sadeyevich Epov, an excavator operator for the "Vostsibugol" production association, Anatoliy Andreyevich Alimov, chief of the Dnepr Railroad and others.

In debating the indicators for the state plan, the delegates examined them from the point of view of how they will be "working" toward acceleration of socioeconomic development of the country, to what extent do they take into consideration qualitative factors of economic growth, the technical level, reliability, the useful life of machinery and equipment, quality of production and services and the quality of all work. In this interested conversation, business-like recommendations were born which merit the most serious attention of planning and management bodies.

The recommendations of the Delegates' Preparatory Commission on the section "Transport and Communications" which were included in the conclusions of the standing commissions of the Council of the Union and the Council of Nationalities concerning the State Plan for the Economic and Social Development of the USSR for the Years 1986-1990 were the result of its work.

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## INTERSECTOR NETWORK DEVELOPMENT

### GOSPLAN'S BIRYUKOV ON TRANSPORT DEVELOPMENT IN 12TH FYP

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 6, Jun 86 pp 17-26

[Article by USSR Gosplan Deputy Chairman V. Biryukov: "Transportation and Communications in the New Five-Year Plan"]

[Text] Transportation is a major sector of material production, employing approximately 10 million people. The fixed productive capital of all types of general-use transport totals almost 14 percent (210 billion rubles) of the fixed productive capital of the national economy. As noted at the 27th CPSU Congress, a major step in raising the welfare of the Soviet people and developing all sectors of the national economy was made in the last five-year plan. National income increased 17 percent compared to 1980. Some 840 billion rubles of capital investment was directed toward the development of the national economy. More than 1,000 modern new industrial enterprises were placed in operation. Based on the uplifting of the economy, average monthly wages for laborers and employees grew by 13 percent; and real income per capita increased by 11 percent.

Approximately 65 billion rubles of overall capital investment was made in developing the productive base of transport over the 11th Five-Year Plan, including more than 22 billion for construction and installation work. Approximately 3,000 km [kilometers] of new lines were placed in operation over the last five years in railroad transportation along with more than 4,000 km of additional main routes, while 4,600 km of railways were electrified. The railroad lines built include Pogromnoye--Pugachevsk (300 km) to relieve the Kuybyshev Railroad, the Masis--Nurnus in the Armenian SSR and bypass lines for the Rostov and Ufa rail centers. In order to develop the oil and gas complex of West Siberia, service traffic was opened up on the Surgut--Urengoy--Yagelnaya rail line (650 km). Through traffic for trains on the BAM [Baykal-Amur Mainline] is being implemented.

Rail connections on the Center--Central Asia, Siberia--Center (Tselinograd--Kokchetav--180km), Center--Northwest (Volkhovstroy--Koshta--178 km) and other routes were strengthened through the construction of second tracks.

Major operations were conducted on the electrification of rail lines on the West--Center (Orsha--Baranovichi--Brest--422 km), Center--Urals (Druzhinino--Yanaul--Yudino--566 km), Central Asia (Karaganda--Mointy--Chu--779 km) and Transsiberian Mainline (Bira--Arkhar--Shimanovskaya--Skovorodino--562 km) routes. These measures made it possible to increase the traffic capacity of the railroads, raise the reliability of their operations and conserve diesel fuel, which is in very short supply in the country.

In maritime transport, the total capacity of transshipment complexes at maritime ports was increased considerably, and 7,000 meters of berths with a handling capacity of 19.6 million tons of cargo a year were placed in operation. Specialized complexes for handling multi-ton containers were built at the ports of Riga, Vostochnyy and Magadan.

The maritime ports of Yuzhnyy (for bulk cargo), Reni (for general cargo) and Vladivostok (for handling lighters) were developed considerably.

In river transport, more than 6,200 meters of mechanized berths with a capacity of 14 million tons of cargo a year were placed in operation, including in such ports important to the national economy as Nizhnevartovsk, Sergino, Labytnangi, Nadym and Urengoy, intended for the delivery of cargo for the purpose of building up the oil and gas fields in the northern part of West Siberia.

For the development of air transport, 47 hard-surfaced runways were built, including at the airports of Krasnodar, Novokuznetsk and Tyumen. Runways were redesigned for receiving modern trunk-line aircraft at Blagoveshchensk, Norilsk, Yuzhno-Sakhalinsk, Sukhumi and Sochi. These measures made possible the non-stop transportation of passengers from the distant regions of the country to laborers' vacation places.

The national economy was supplied with approximately 2.5 million motor vehicles in the last five-year plan, including 1.45 million for agriculture.

The shipment of freight by truck for agriculture and for general use was developed at a rapid rate.

The passenger traffic on general-use buses in 1985 increased by 14 percent compared to 1980 and totaled 444 billion passenger-kilometers, and the overall volume of light taxis increased by more than 20 percent.

Steps were taken to raise the utilization efficiency of trucking equipment in the national economy, to strengthen the struggle against documentation in shipping freight by truck and to provide for the conservation of fuels and lubricants. As a result, documentation was reduced, the team contract was developed and the system for accounting for the dispatch of petroleum products was improved. This ensured the more economical consumption of liquid fuels.

The roads were also developed in the 11th Five-Year Plan. At the beginning of 1985, the length of general-use motor-vehicle roads totaled 975,000 km,

including approximately 800,000 km (81 percent) with hard surfaces. Material and technical supply was improved considerably and order was strengthened in the financing of road construction. The construction of such major auto roads and Minsk--Brest, Moscow--Serpukhov, Kaunas--Klaypeda and Kishinev--Beltsy was completed, as well as bridge crossings of the Dnepr (at Kherson), Neva (at Leningrad), Tobol (at Kurgan), Volkhov (at the town of Gruzino) and other rivers. Operations were improved in developing the road network on the part of the ministries of road construction and the councils of ministers of the union republics, and a strengthening of the attention of ispolkoms of local soviets made it possible to place in operation 73,500 km of roads, including 8,100 km nationwide and republic ones.

The targets established by the 26th CPSU Congress for rendering communications services to the population, automation and the incorporation of telephones were fulfilled, and were overfulfilled by 10-15 percent for the introduction of capacity in cable and radio-relay lines and radio broadcasting stations.

The Fundamental Areas of Economic and Social Development of the USSR for 1986-90 and for the Period to the Year 2000 envisage the further development of transportation proceeding from the fundamental tasks of this sector--the timely, high-quality and full satisfaction of the needs of the national economy and the population for shipping and raising the efficiency of its operation. Envisaged in the 12th Five-Year Plan is an increase in freight shipping to 37 billion tons (an increase of 12 percent) and passenger turnover to 1.14 trillion passenger-kilometers (13 percent), which will basically satisfy the needs of the national economy and the population for shipping.

A most topical problem is accelerating the development of passenger transport, since the high rate of passenger transport causes a growth in the services offered to the population.

The Fundamental Areas state: "Improve all types of transportation service for the population. Take into account more fully the requirements for transportation comfort and increase the climate of service. Increase passenger turnover in general-use transport by 12-14 percent in 1990." (Footnote 1) (Fundamental Areas of Economic and Social Development of the USSR for 1986-90 and for the Period to the Year 2000. Moscow: POLITIZDAT, 1986. p 54.) This is not only an economic task, but a social one as well.

The transportation of passengers within cities will be developed at a more rapid rate and will grow by 20-25 percent. The continuation of the development of existing metro systems and the construction of new ones is projected in order to assimilate such a considerable increase. The construction of underground mainlines will begin in Chelyabinsk, Omsk, Krasnoyarsk, Alma-Ata, Riga and other major cities. Much attention is being devoted to improving the operation of traditional types of city transport: buses, trolleys and trams. Much must be done to improve passenger service for the population of rural areas.

The realization of a group of measures for improving planning in transport is projected, including those that are envisaged by the CPSU Central Committee and the USSR Council of Ministers decree of 28 Oct 82, "Improving the Planning and Organization of Shipping Economic Freight and Passengers and Strengthening the Influence of the Management Mechanism on Raising the Efficiency of the Operation of Transport Enterprises and Organizations." Some of the measures are already reflected in the plan for 1986.

Beginning in 1986, an experiment will be conducted on expanding the rights of enterprises in economic activity at the enterprises of the ministries of motor transport of the RSFSR, Belorussia, Latvia, Georgia, Kazakhstan, a number of motor-transport main administrations and all of the river shipping companies of the RSFSR, at the Latvian, Baltic and Black Sea shipping companies of Minmorflot [Ministry of the Maritime Fleet] as well as on the Southwest and Dnepr railroads (the experiment began in 1985 on the Belorussian Railroad). It is aimed at seeking specific forms for the optimal combination of various management methods which will provide for the maximum growth in efficiency of the resources utilized and an increase in the vested interest and responsibility of enterprises for the results of operations and the decentralization determined in resource management. A specific feature of the experiment is that a limited number of indicators differentiated by the operational features of each type of transport is approved in the enterprise five-year plans. Thus, "Volume of Shipping" (the dispatch of freight in tons) has been approved as a principal confirmation and valuation indicator for all types of transport, and not "Freight Turnover" in ton-kilometers, as before. The "Amount of Income from the Sale of Services to the Population" is also related to the valuation indicators. In maritime transport, furthermore, the indicator "Net Foreign-Currency Proceeds" has been introduced.

Some results from the experiment conducted on the Belorussian Railroad can already be summarized. With a decrease in the number of employees of 12 percent, an increase in labor productivity of 18 percent was achieved. Taking into account the results of the experiment, the transfer of all enterprises and organizations of all transportation ministries to operations under the new conditions is projected for 1987 so as to increase their responsibility and expand their rights (both as freight shippers and recipients) to develop and realize high-quality shipping plans.

Improving transportation and economic contacts, the locations and specializations of production and the pattern and rational shipping of freight among types of transport will ensure a relative reduction of freight traffic in railroad transportation of 160 billion ton-kilometers in 1986-90 and a reduction in transportation expenses in the national economy of roughly 0.8 billion rubles.

The Fundamental Areas envisage the coordinated development of a unified transport system. All types of transport--railroad, truck, maritime, river, air, pipeline, industrial, urban etc.--should be considered a link in a unified integrated transport system. Every type of transport should have its sphere of most rational application. At the same time all of them,

interacting closely with each other and with other sectors of the economy, should be an organic part of the unified complex of the national economy.

For the coordinated action of all the elements of the transport system and the elimination of disproportions and the liquidation of "jams," and consequently the failures in operation that sometimes aggravate the whole system, precise coordination is needed both in the planning of capital investment and in the organization of shipping. Also essential is a precise and harmonious rhythm in the operation of collectives of related industries. It can be achieved only with the business-like cooperation of all transportation employees and with their coordinated activity.

The rich experience in coordinating operations and efficient intersectorial socialist competition accumulated by the transport workers of Leningrad and Odessa and their followers should be widely disseminated.

Much attention is devoted to resource-conserving measures. It is essential to achieve a situation where the increase in requirements for fuel, power, raw and other materials is 75-80 percent satisfied through their conservation. In particular, an increase in the shipping of freight in containers and parcels to 160-170 million tons (a growth of roughly 1.4 times) is envisaged over the five-year period. Based on the introduction of progressive technology in driving heavy and long train consists in rail transport and taking into account the experience of the Moscow Railroad approved by the CPSU Central Committee, the average freight train weight is projected to increase from 3,000 to 3,320 tons. The increase in freight traffic on the railroads of the country will be provided for basically through this.

The implementation of the tasks arising from the Fundamental Areas requires the widespread utilization of the achievements of scientific and technical progress. Therefore, an orientation toward the assimilation of growing shipments by way of increasing the technical level of the corresponding railways, as well as through improving the technology of shipping and the application of more productive rolling stock, should be common to all types of transport. Thus, the proportion of shipments of dry cargo using progressive transport-process systems in maritime transport (ferry, lighter ships, etc.) will increase by 25 percent, and the shipping of cargo in multi-ton containers will increase from 35 to 50 percent. In river transport, the shipping of cargo in large tug cargo consists will increase by 1.4 times, along with 1.2 times for combined-sailing "river--ocean" (without transshipment) vessels; in air transport, the share of passenger transport with a low proportionate fuel consumption will increase. The technology of shipping will be improved in trucking through a rapid rate of growth in the shipping of freight using trailers and semi-trailers along with other progressive technologies.

The task has been posed of eliminating small and economically inefficient trucking facilities, today numbering 263,000, that have from 1 to 49 trucks, and uniting them into large trucking enterprises with economic accountability. This will permit an increase in their efficiency.



The pipeline transport of petroleum, petroleum products and especially gas will be developed at a rapid rate.

The pipeline network currently totals 260,000 km, including 180,000 km of gas pipelines, 63,000 km of petroleum pipelines and 18,000 km of petroleum-products pipelines. The laying of 59,600 km of gas pipelines, 4,300 km of petroleum pipelines and 9,400 km of petroleum-products pipelines is projected over the five-year period.

The further development of the country's transport system is indissolubly linked with strengthening its material and technical base, which will permit a considerable improvement in service to the national economy and the population of the country and will facilitate a growth in shipping.

More than 67 billion rubles of capital investment are projected for the development of the material and technical base of transport in 1986-90 (taking into account the funds of union republics for road construction that are provided for in the centralized procedure for material and technical resources), including 22.5 billion rubles for construction and installation work, or a growth compared to 1981-85 of 4.3 and 1.9 percent respectively. The amount of funds for technical retooling and reconstruction is envisaged to increase by 5.8 billion rubles compared to the current five-year plan. Basic transportation funds will grow by 25 percent. Funds will be concentrated on the most important construction sites through a reduction in the number of facilities under construction at the same time.

As before, rail transport will retain its role as the main form of trunk transport, providing basic interregional transport connections, and the leading form of intercity passenger routing, especially at medium distances.

The task has been posed of increasing the amount of freight shipping by railroads by 9 percent, and that of passenger turnover by 7.5 percent. The amount of freight shipping for railroad transport overall will total 4.3 billion tons in 1990.

The principal freight in shipping is fuel. In 1990, 635 million tons of oil and gas condensate will be produced, for which it is essential to continue the development of the oil industry in West Siberia, the Kazakh SSR and the north of the European part of the USSR.

Gas production will total 850 billion cubic meters, basically in West Siberia, Yamburg and on the Yamal Peninsula.

Coal production will reach 795 million tons, wherein the increase will be generated chiefly by the eastern regions of the country, which predetermines the necessity of assimilating growing shipments of coal in the east--west direction. In this regard, the construction of railroads, second tracks and pipelines in this region acquires especial significance. The placement in operation of 2,700 km of new lines and the construction of no less than 4,000 km of second tracks and 8,000 km of electrified lines is envisaged. As in the current five-year plan, the laying of principal lines will be conducted in the

eastern part of the country where natural resources are being assimilated at a rapid rate.

The task has been posed of placing the BAM in continuous operation along its entire length in the current five-year plan, and to begin the broad-scale economic assimilation of the zone of this mainline.

The construction, installation and railroad workers will have to place in operation a multitude of facilities, including, perhaps, the most complex fifteen-kilometer Severo-Muysk tunnel. The leading construction subdivisions are already beginning construction of railroads leading from the smaller BAM to the north and to Berkakit--Tommot--Yakutsk. This is one of the most important construction projects of the new five-year plan.

The dreams of several generations of domestic railway engineers are being realized. The beginning of construction on the Caucasus Pass Railroad is planned. This is comparatively short line of approximately 180 km. It should pass through the Main Caucasus Range and join the Transcaucasus with the European part of the country by the shortest route. Here, on a very narrow work front in the most complex mountain terrain, dozens of unique artificial structures will be built and the 23-km Arkhotskiy Tunnel will be cut. In this same region, the placement in operation of the Marabda--Akhalkalaki is projected and the construction of the Vardenis--Dzermuk railroad will be developed. These lines will have great significance for the development of the national economy of Georgia and Armenia.

The completion of the construction of the new Blagodarnyy--Budenovsk and Surgut--Urengoy lines along with the construction of bypass lines for a number of rail centers is planned.

Railroad access to the west from the Kuznetsk and Kansk-Achinsk coal basins is being strengthened. The formation of the Central Siberian Mainline is being completed and the Ulyanovsk--Saratov--Volgograd--Tikhoretskaya line is being redesigned.

A much greater volume of work than was executed in the 11th Five-Year Plan will be done on switching railroads to electric traction. The share of electric-locomotive traction of the total volume of railroad freight traffic will grow and should total no less than 67 percent. The electrification of the Transsiberian Mainline should be completed. As early as next year, the overall length of electrified railroad lines will exceed 50,000 km. The overwhelming portion of freight and passenger transport is carried out on them. This is a manifestation of the Leninist predestination of the electrification of the country, an achievement of which we can all be proud.

The traffic capacity of the railroads of Kazakhstan and Central Asia will increase with the completion of construction of second tracks and the electrification of the Mointy--Chu--Arys section.

One of the principal measures for increasing the traffic and freight capacity of railroads is the development of station facilities with the completion of the lengthening of the receiving and dispatching tracks to existing standards. In the 12th Five-Year Plan, railroad transport will receive a large quantity of new railcars, electric locomotives, diesel locomotive sections and passenger cars.

Rolling stock will be supplied in the upcoming five-year plan with an increase of 1.3-1.4 times in the share of specialized cars. This will expand the opportunities for raising the level of mechanization of labor-intensive loading and unloading operations. The completion of the conversion of the freight-car fleet to roller bearings is projected, which will allow a considerable reduction in the consumption of electricity and fuel for train traction as well as of lubricants.

Among the immediate tasks in the sphere of scientific and technical progress in rail transport are the assimilation of the series production of 8-axle gondola and tank cars with more capacity, locomotives rated for operations in a system with many units and passenger cars with increased capacity without reducing the comfort level, as well as the creation and assimilation of the production of rails with increased strength and the creation of a set of machinery for the current upkeep and repair of track.

Trunk-line transport interacts closely with industrial and new types of transport, which carry out the overwhelming portion of labor-intensive loading and unloading operations. In the current five-year plan, therefore, the comprehensive and proportionate development of industrial transport will be ensured. This is aided by the fact that for many years at many enterprises, basic production was developed more rapidly than transport facilities. This led to great complications not only in the operations of these enterprises, but of the whole transportation conveyor. The use of conveyors and pneumatic-container transport, aerial ropeways and other progressive means of continuous freight delivery will be expanded in industrial transport. The incorporation of pipeline hydro-transport for mineral concentrates and coal will be strengthened. An experimental Belovo--Novosibirsk pipeline for the hydro-transport of coal a distance of 260 km is being built.

A 220-km concentrate pipeline will be built from the Stoylensk GOK [mining and concentrate combine] to the Novolipetsk Metallurgical Combine in 1987-89. A 14-km trunk belt conveyor for shipping 27 million tons of coal a year from the Berezovo Strip Mine to the enrichment mill will enter operation in 1986.

USSR Gosplan, in conjunction with interested ministries, has prepared a plan for a comprehensive program for the further incorporation of continuous and specialized new types of transport and the creation of new equipment and its most rapid incorporation into the national economy.

The development of maritime transport is aided by the need to assimilate growing volumes of cargo shipping of Soviet imports and exports, as well as cargo for the national economy between Soviet ports. With these aims, the

transport fleet will be replenished with highly productive and economical specialized vessels, and the icebreaker fleet will be further developed.

The lengthening of navigation in the Arctic is projected with the year-round delivery of cargo in its western region to the Vilkitskiy Strait based on the use of powerful nuclear-powered icebreakers and icebreaker-transport vessels.

The total capacity of the transshipment complexes in the maritime ports, including Vostochnyy, Yuzhnyy, Magadan, Ilichevsk, Odessa and Izmail, will be increased considerably. The USSR--GDR (Klaypeda--Sassnitz) railroad ferry crossing will enter operation.

Taking into account the limited opportunities for supplying maritime transport vessels, Minmorflot must seek out additional ways for intensifying the use of the existing fleet, especially the new vessels and first and foremost the progressive specialized types.

River transport will be developed for supporting the interregional shipping of mass cargo as a "partner" of rail transport. The amount of river shipping will increase by 9.1 percent.

On the interior water network, work must be completed on eliminating depth gradations on the trunk lines of the Unified Deepwater System, navigational conditions must be improved on the rivers of Siberia and the Far East and the development of port facilities must be continued.

Guaranteed depths on the section of the Don below Ust-Donetskiy Port will be increased thanks to the construction of the Bagayevsk Hydraulic Development, the construction of which will begin in the current five-year plan.

With the aim of improving navigation on the Belomorsk--Baltic Canal, work will continue on the reconstruction of locks and the replacement of wooden structures with reinforced-concrete ones.

In order to increase the reliability and efficiency of navigation on the Lena, the construction of a low-pressure hydraulic development with a navigable lock below the Port of Osetrovo is planned, which will permit an increase in the guaranteed transport depth on the Osetrovo--Kirensk section from 1.8 to 2.5 meters.

With the access of the Berkakit--Tommot--Yakutsk railroad line to the Aldan River, the construction of a port in Tommot will begin. These measures will permit the river fleet to provide for increased cargo shipping volumes in Siberia and in the North.

A considerable rate of development in river transport is also envisaged for shallow rivers. The development of the icebreaker fleet makes it possible to lengthen the guaranteed navigation period for river transport. The unit cargo capacity of the vessels of the powered and towed fleets will be increased: the construction of river-ocean-class steam cargo vessels of 2,500-4,000 tons

of cargo capacity in place of 2,100-2,700-ton vessels, Ozernyy-class steamships with 3,000 tons cargo capacity in place of 2,800-3,000-ton vessels etc. As a result of these measures, the technical level of the river fleet will be raised (the average cargo capacity of powered vessels by 9 percent, and that of towed consists by 10 percent).

The development of air transport will be directed toward expanding passenger connections at great distances on domestic and international lines, as well as in regions that are deprived of a developed network of ground transport. Passenger turnover will increase by 16.8 percent, and proportionate fuel consumption will be reduced by more than 5 percent.

The operation of new highly efficient aircraft will begin both for passenger transportation and for agricultural operations and specialized operations in the sectors of the national economy. Among the aircraft that should receive mass application are the Il-86 (for the most heavily loaded air routes), the Yak-42 (to replace the Tu-134 A/B) and the Tu-154M (a modification of the Tu-154B with the installation of more economical engines).

The principal area of development of aircraft for use on local air routes is the transition to promising models with increased cargo freight capacity and improved fuel characteristics. The helicopter fleet of civil aviation consists of helicopters whose economic efficiency and technical level were determined by technical solutions adopted in the 1950s and 1960s. Under the conditions of the forecasted limitations in the supply of fuel, it is essential to replace all types of helicopters that are in operation with new ones that have a maximum commercial load of up to 20 tons.

Planned is the completion of construction on airports in the developing regions of Siberia (Krasnoyarsk), the Far East (Magadan) and the Far North (Mirnyy) that will provide for reliable non-stop air contacts between these regions and the central regions of the country and the resorts of Crimea and the Caucasus. A strengthening of the ground-support facilities of civil aviation is projected along with an increase in the efficiency of its utilization, the construction of new airports and the reconstruction of existing ones, the incorporation of automated air-traffic-control systems and the raising on this basis of the quality and safety of air transportation.

In motor-vehicle transport, increases in the shipping of freight of 18-19 percent and the passenger turnover of the general-use bus fleet of 14-16 percent are planned. The composition of the fleet by freight capacity of trucks and carrying capacity of buses will also be further improved. For this it is essential to increase the production of trucks with small freight capacity (up to 2 tons) and with large capacity (more than 8.1 tons).

A major reserve for conserving liquid fuel is the conversion of the truck fleet to diesel, through which more than 7 million tons of standard fuel will be conserved in 1990 versus the 1985 level. It is envisaged to bring the share of freight shipping that is carried out by diesel trucks to 60 percent of the total volume. Insofar as a considerable expansion of the application

of gas-cylinder trucks is projected, it is essential to accelerate the construction of natural-gas filling stations. Increasing the use of compressed and liquified natural gas in trucking will permit the conservation of roughly 4.5 million tons of standard fuel in 1990.

In the sphere of road facilities, 167,000 km of hard-surfaced roads will have to be built and redesigned over the 12th Five-Year Plan, including 75,000 km of general-use road and 92,000 km of farm roads in rural areas; the construction of roads linking the central farmsteads of kolkhozes and sovkhoses to rayon administrative centers will be completed; and, the operational features of roads will be improved substantially along with the equipping of passenger and driver service facilities and motor-vehicle repair points. The target of the Food Program for the construction of oblast and local roads (130,000 km) in 1981-90 will be fulfilled.

The technical level of roads will be raised. The amount covered with hard surfaces is projected to increase by 9.5 percent (from 78 to 86 percent of the proportion of the total mileage of roads).

In the sphere of communications development, an acceleration of the incorporation of new equipment and efficient modern communications equipment is projected in the 12th Five-Year Plan.

Local and intercity communications networks will be developed on the basis of automated telephone stations with programmed control. They total 40 percent of the local and 70 percent of the overall volume of intercity start-ups. By the end of 1990, the level of automation of intercity telephone communications is projected to increase to 72 percent. The proportion of digital data transmission systems that will be incorporated into trunk and zonal communications lines over the five-year plan will reach 27-33 percent. In the 12th Five-Year Plan, the assimilation of production and the implementation of the incorporation of fiber-optics communications lines is projected.

The amount of telephone service rendered to the public will be increased by 1.7 times. The number of automated intercity pay telephones will increase by 2.5-3 times and basic telephone apparatus for urban and rural telephone networks by 1.4 times, including 1.5 times for those installed for the public. The completion of the organization of production telephone communications at all kolkhozes and sovkhoses is projected along with the inclusion of 43 percent of these facilities in dispatcher communications.

Some 46 telegraph switching stations using computers will be incorporated into the telegraph network, which will permit an acceleration of telegram passing and a considerable increase in labor productivity. The transmission network of central newspapers will be developed based on the widespread application of the rapid transmission systems on the Moskva and Orbita satellite communications channels.

By 1990, basically the whole population of the country will be provided with two television programs, and three or more in the capitals of the union

republics and major cities. Satellite television systems will be widely used for this purpose.

By the end of the five-year plan, it is projected to ensure the capability of receiving no fewer than three radio-broadcast programs basically on the long, short and ultrashort wavelengths, including the first program for central radio broadcasting for the entire population of the country, a second program for central and one program for republic radio broadcasting (three central radio-broadcast programs on the territory of the RSFSR) for 100 percent of the urban and 95 percent of the rural population of the country.

In postal communications, the level of motorized delivery of mail and printed matter in rural localities will be brought to 35 percent, and the amount of container shipping will be expanded considerably.

The amount of communications services will increase by 27 percent in the 12th Five-Year Plan and will total 12.1 billion rubles in 1990. The amount of sale of communications services to the population will increase by 50 percent and will reach 4.2 billion rubles in 1990. Labor productivity at communications enterprises will increase by 25-26 percent. Some 96-98 percent of the increase in communications services will be obtained through its growth.

The operational reliability of the unified automated communications network of the nation will be increased based on the newest achievements of science and technology. In the current five-year plan, 7 billion rubles of capital investment will be allocated for developing the material and technical base of communications, including 2 billion for construction and installation work. Furthermore, the use of credit will total 2.5 billion rubles, of which 1 billion is for construction and installation work. This will permit an increase of 40 percent in the total amount of capital investment.

All enterprises have been transferred to new management conditions beginning in 1986. Economic conditions and incentives have been created for them that facilitate the acceleration of the technical retooling of the sector and the raising of the efficiency of operations, the quality of services and a climate of service.

The measures envisaged for increasing the efficiency of transport operations and means of communication will facilitate the maximum satisfaction of the needs of the national economy and the population for shipping by all types of transport and all communications services.

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## INTERSECTOR NETWORK DEVELOPMENT

### CHANGES IN TRANSPORT TARIFF STRUCTURE SUGGESTED

#### Rail Sector Aspects

Moscow EKONOMICHESKAYA GAZETA in Russian No 22, May 86 p 7

[Article by V. Rusakova, candidate of economic sciences: "When Discounts are Profitable."]

[Text] In our opinion, improvement in pricing should also of necessity affect freight shipment tariffs. One of the fundamental directions in this matter lies in strengthening the stimulating effect of tariffs in reducing transport costs.

It is expedient to use tariffs more actively to form economic transport links. Inefficient shipments cost 400-500 million rubles per year. In our opinion, when accounting for them, one must broaden the list of sanctions in the form of increases in the tariff rate. Thus, if a cargo is consigned for shipment over a route which does not coincide with the normal freight flow system, double the rate should be paid for this shipment. (efficient shipping networks are developed by the MPS [Ministry of Railways] and Gossnab USSR for large-tonnage cargos). In other words, the cartage rate should be levied as for shipment in accord with the normal freight flow system, plus a tariff for actual shipment, with the second part of the fee being set with regard to the profit of the enterprises or organizations.

About one-third of the freight ship by rail moves a distance of up to 200 kilometers, with one-sixth of this amount moving up to 50 kilometers. The MPS has turned to Gosplan USSR and Goskomtsen [State Committee on Prices] more than once with the proposal for increasing rates for short-distance freight shipments since their costs are significantly more than the network average. The aim of these proposals is to reduce the number of such shipments and shift them over to motor vehicle transport, which is justifiable from a national economic point of view. This also presupposes improvement in the vehicle fleet structure and its being made more efficient. Of course not all short-haul runs are inefficient. If they are carried out with loading and unloading gone on sidings, and in certain other instances, it is inexpedient to shift them to motor transport. In fact, if this were the case, the delivery time and costs would increase due to transfers from one transport to another. Therefore a differentiated approach is needed which takes into consideration the concrete conditions and



capabilities of motor vehicle transport. As a general measure, it appears necessary to examine seasonal tariff differentiation closely, for example, to introduce during the spring-summer and autumn periods higher rates for shipment of non-agricultural products over distances less than 200 kilometers if their average shipping distance exceeds 200 kilometers.

Main line shipments are very efficient, but they are not stimulated by tariff measures. It seems to be expedient to establish significant discounts from the rate for main line shipments for a wide range large-tonnage freight. Then it will be profitable for railroad workers to extend the main lines not to 300-350 kilometers, as is now the case, but to greater distances, to the end of the line.

There is yet another reserve for savings in transportation. This is the efficient utilization of constant routes over which trains run empty. Freight shipments over them is about 35 percent cheaper. Lower rates for routes over which the trains run empty are utilized extremely seldom, and only for several types of freight on a negligible number of sectors. For example, the Western Siberian Metallurgical Combine is supplied with iron ore primarily from the Korshunovskoye mines in Irkutsk Oblast. With the introduction of reduced rates for routes over which the trains run empty, it is more profitable for them to get ore from the Sokolovsko-Sarbayskoye mine in Kustanay Oblast. Delivery of 1 ton of ore will be about 0.8 ruble cheaper. Another example: mineral fertilizers are delivered to Kiev Oblast from Solikamsk, a distance of 2500 kilometers. Under the reduced tariffs, as estimates have shown, it is more profitable to supply the oblast with fertilizers from Soligorsk (BSSR). This will permit a savings of about 3 rubles per ton of fertilizer delivered.

In our view, introduction of the proposed tariff measures are possible until general tariff reform, and it could promote a cut-back in transport costs as well as an improvement in the utilization of transport's production capabilities. The efficiency of these measures will grow as transport costs are standardized.

#### Trucking Sector Aspects

Moscow EKONOMICHESKAYA GAZETA in Russian No 22, May 86 p 7

[Article by I. Akhpolov, candidate of economic sciences, Director of Laboratories, State NII [Scientific Research Institute] for Motor Vehicle Transport (NIIAT): "Tariff Rifs"]

[Text] Industry is increasing output of heavy trucks and tandem trailer trucks. Their operation at full capacity will provide a considerable savings for the national economy. The system of tariffs, by means of which costs are recovered, the necessary level of savings for transport organizations is insured and client expenses for freight delivery are determined, has been called upon to stimulate the efficiency of transportation. Will the existing tariffs cope with their role?

Let us assume that a freight owner has to ship 100 tons a distance of 50 kilometers. Which is more profitable to him: to use 5-ton trucks, for which it will take 20 trips, or to use 20-ton tandem trailer trucks, which will take 5 trips? Let's add that the man-hours per job for the first choice are greater by a factor of 2.5. Moreover, the 5-ton trucks will "eat up" 790 liters of gasoline, while the tandem trailer trucks will need 275 liters of diesel fuel, which is one-seventh the price, on a cost basis.

The answer seems apparent. But this is not so. It turns out that as far as the client is concerned, the choice makes no difference. In either case, he pays the same amount in tariff -- 250 rubles.

At the same time, the expenditures of the motor transport enterprise (ATP) are far from equal based on production cost: 350 rubles in the first case and 150 rubles in the second. It turns out that only the enterprise is interested in the utilization of heavy trucks.

In the Basic Tendencies they pose the task of increasing the efficiency of truck transport equipment, primarily by the widespread use of trailers and semi-trailers and reduction of nonproductive expenses, empty truck runs and inefficient shipments. To do this, in my view, we simply need to improve the rate system.

The lack of an economic interest on the part of freight owners to make their shipments larger is only a part of the problem. There is yet another side.

In the rate for shipment of a distance of 25 kilometers there is a built-in cargo capacity [for the vehicle used] of about 6 tons, and the tariff rate is set at 1.5 ruble per ton. The standard shipping cost calculated per ton when shipping 2 tons is about 3 rubles. The cost of shipping freight the indicated distance using tandem trailer trucks (e.g. building freight) costs less than a ruble per ton.

As we see, when all other conditions determined by the tariff are met, shipment of less than 6 tons per run is unprofitable. And it is precisely within these limits, as a rule, that dispatches are made up within the system of trade, supply, public catering and agriculture, i.e. the highest volume of shipments under urban or rural conditions. Conversely, large freight consignments turn out to be groundlessly highly profitable without regard for the organization of transport operations. One of the causes of this situation is the irregularity of existing tariffs.

The task of combining national economic interests with the cost accounting interests of the operation of the transport organizations themselves and the organizations utilizing transport services is most complicated in improving the tariff system. One way to resolve it is seen to lie in a better substantiated differentiation of transport rates.

A reexamination of the rates for freight shipment by motor transport was completed in 1982. A number of substantial changes were introduced in the new tariffs, including their partial differentiation as a function of the dimensions of freight consignments being dispatched.

Differentiation (even though only partial) was properly seen as an effective measure to bring rates closer to the labor costs needed by society. However, in spite of the economic logic, engineering estimates, the opinion of a majority of practical workers and foreign experience, Goskomtsen RSFSR came out with an initiative which was supported by Goskomtsen USSR, and they performed a "surgical operation" on the tariff rate schedule to remove the most important item -- differentiation. Moreover, corresponding recommendations were given to the union republics' committees on prices.

No matter how vexing, instead of a business-like, state approach, the price setting bodies were held captive by old conceptions and, one may say, they eliminated the basis for further improvement in piece-rate tariffs. Under-evaluation of this factor in the base plan causes great distortions in other sections of the tariff schedule. The forced, artificial adjustment of individual sections of the tariffs below the established level of profitability results in a significant separation between tariffs and standardized costs.

In summation, the size of obtainable profit depends little on indicators of the efficiency in the operation of trucking organizations. An analysis using economic statistical methods shows the lack of a close link between the level of profitability and labor productivity, output of rolling stock, degree of conversion to diesel engines, etc.

During the period during which the decision was being prepared, an experts' study was made at Goskomtsen USSR of the entire tariff schedule, with this very question coming to light in a glaring fashion. It was noted in the decision of the commission of experts, which included the most highly qualified specialists, that the lack of tariff differentiation as a function of the size of the shipments is a substantial shortcoming and that it is necessary to provide for consequential realization of the principle of equal profitability of the different types of transport services. Unfortunately, the opinion of the experts was disregarded.

It is entirely natural that in the first stages of practical realization, each new matter causes certain misunderstandings, difficulties in application and the need for making changes in the rules and documentation which are in use. The system of price-setting bodies exists for this reason, to make long-range strategic decisions regarding the development and change in the pricing system and to insure the necessary conditions for their realization.

It was necessary for the price-setting bodies to provide motor transport workers and their clients with appropriate explanations for proper and mutually profitable application of the new tariffs. This was not done, and Goskomtsen RSFSR decided to eliminate a progressive section to "eliminate questions."

An analysis of the actual financial results of 13 ATP from "Lentorgbytttrans" association, which specialize in shipping commercial goods and articles for public catering confirms the erroneousness of the decision which was adopted. In practice, they all started to operate at a total loss. The average level of loss is more than 25 percent. Now to provide the economically necessary operating conditions, the average tariff level will have to be raised by a factor of 1.7.

We will not, however, simplify the essence of the matter and take the so-called 'narrow-departmental' position. It was no coincidence that the 22nd Party Congress posed the task of improving the structure of the motor pool for both industry and transport. It is often the case that a meagre load is shipped in the enormous body of a powerful truck.

Increasing the efficiency of transportation is a complex national economic problem. Its solution presupposes first of all some improvement in the structure of transport facilities, which should be efficient when shipping both large and small cargos over various distances. It is no less important to provide for efficient routes and the centralization of transportation. And finally, it is entirely expedient to utilize the effect of tariffs.

For tariffs to be a basis for economic management methods and development of cost accounting and for them to play an active role in the selection of the most efficient means for freight delivery, it is necessary, it would seem, to return to a problem which has been solved and realize the principle of point-by-point [skvoznoy] differentiation without waiting for a general re-examination of tariff rates for all types of transport.

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INTERSECTOR NETWORK DEVELOPMENT

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LESS TRANSLOADING URGED FOR RIVER-RAIL SHIPPING NETWORKS

Moscow ZHELEZNODOROZHNYI TRANSPORT in Russian No 5, May 86 pp 48-51

[Article by Doctor of Economic Sciences A. G. Zakharov and engineer and economist G. V. Miroshnichenko: "Railroad Transport on Combined Routings"]

[Text] The tasks of transportation are determined in the Fundamental Areas of Economic and Social Development of the USSR for 1986-90 and for the Period to the Year 2000: the timely, high-quality and complete satisfaction of the needs of the national economy and the population for shipping and a raising of the efficiency of its operation. These requirements relate fully to the shipping of freight on combined routings with the participation of rail and river transport.

Two periods can be singled out in the development of shipping on combined rail-river routings. The first period is from 1945 to 1975. Over this time, the amount of combined shipping grew continuously, with the exception of 1970, and reached its maximum value of 68.15 million tons in 1975, which exceeded the 1940 level by more than 9 times. The second period is from 1976 to the present. Over this period, the amount of combined shipping has declined from 68.15 million tons to 63.64 million tons, or by 7 percent, and only in 1978, 1981 and 1983 was a more or less significant growth observed compared with the preceding period.

The demand for freight shipping in combined routings, especially in the period from 1945 to 1975, was determined to a considerable extent by the limited economic and technical capabilities of railroad transport for the organization of direct routings without transshipment. For this reason, part of the freight was switched from direct rail to combined routings each year with the aim of easing the load on the railroads and creating additional traffic capacity reserves on them. It was characteristic of this period that the demand for combined shipping grew continuously.

The traffic capacity of rail transport has grown to the extent of its development and the incorporation of more productive equipment and technology. As a result, conditions were created under which the development of combined shipping was limited basically by economically expedient shipping compared to

direct rail shipments. A feature of this stage of development of shipping on combined routings was their reduction in connection with the increased capabilities of assimilating these shipments on direct rail routings. A reverse process was also characteristic of this period--the transfer of shipments from combined routings with two transloadings to direct rail routings, where they were more economical. A million tons of coal, iron ores, timber and other freight were transferred to direct rail routings in the 11th Five-Year Plan.

It is well known that the transfer of freight from rail to river transport is carried out by transloading. As a result, for every transshipment the number of beginning and ending operations executed, including loading and unloading, increased by several times (with one transloading--by two times, with two--by three times). Furthermore, the operation of interacting types of transport was complicated due to the uncoordinated arrival of railcars and vessels at junction points.

Research conducted by the All-Union Scientific Research Institute of Railroad Transportation (VNIIZhT) showed that transshipments on combined routings with two freight transloadings had a series of shortcomings compared to direct rail routings. First and foremost, additional work arises in them, but the amount of freight shipped does not. Furthermore, the disparity in size of the freight dispatches on rail and river transport causes additional time expenditures for the accumulation of freight at river ports and increases delivery times and transshipment expenses. For these reasons, the risk of freight spoilage increases and interruptions arise in production and trade.

With regard to the seasonality of combined routings, the problem of transportation support is resolved only in the navigable periods. The impossibility of a connection without transshipment between enterprises that have rail sidings leads to a substantial increase in cost and delays in the delivery of freight to the consumer.

The shortcomings indicated have restrained the development of combined shipping at all stages and currently continue to exist. In cases where the rapid delivery of freight under conditions of production or preservation of its quality are essential, combined routings become ineffective.

It is impossible to base an evaluation of combined routings only on the shipping volume achieved. It is necessary that the development of these routings provide essential relief for the railroads, which are experiencing difficulties, and an expansion of the sphere of application of the unified transport system of the country through the organization of additional connections with a reduction in the transport expenses in the national economy.

Combined routings increased most significantly in the period from 1950 to 1960, when the opportunities for providing the national economy with direct rail shipping were limited. River transport had several advantages at that time compared to rail transport, specifically the low cost of shipping mass

freight along main rivers, especially petroleum products and timber on rafts, as well as enormous reserves of traffic capacity and less need of capital investment for the construction of track. In those years, for example, more than 50 percent of river-transport freight shipments fell to the Volga-Kama Mainline alone, the cost of which was roughly half that of the corresponding railroads. The development of combined shipping, however, including with the participation of this most major mainline, did not satisfy existing requirements due to the inadequate development of the fleet and the ports. In the period from 1960 to 1970, the demand for combined shipping declined and the increase in freight shipping on these routings totaled 2 percent compared to shipping on direct rail routings, and 1.7 percent for the period from 1970 to 1980.

At the modern stage, the slowing of the growth rate of combined shipping, especially in the European part of the country, is partially a consistent process.

First and foremost, there does not exist a direct link between the deposits of many minerals (coal, apatite, quartzite, iron ore, iron pyrite etc.), which are centers of mass freight traffic generation, and water routes.

The river transport mainlines do not coincide with the geography of the principal freight traffic of mass bulk freights. Furthermore, the shippers of the freight are not oriented toward its delivery on combined routings on economically efficient routes.

The mass bulk freight traffic, where expansion of the interaction of rail and river transport is potentially possible, is basically formed in the regions of Siberia and the Center along with the Urals and the Center. In order to carry out the growing volume of freight shipments from these regions along overloaded legs on, for example, the Urals-Center route, they must either be strengthened or have their loads reduced. At first glance, the most economical load reduction method is to utilize river transport. The Volga and Kama river routes should have at least the necessary reserves of traffic capacity for this.

In the opinion of certain specialists, the Volga-Kama Mainline has considerable reserves of traffic capacity. This evaluation, however, is not supported by the research of the Central Scientific Research Institute on the Economics and Operation of River Transport (TsNIIIEVT), according to which the traffic capacity of the Unified Deepwater System, including the Volga and Kama rivers, is currently limited by hydrotechnical structures. The most limiting of these are the hydroelectric power plants (GES) and vessel passage structures--locks. A worsening of navigational conditions, especially with regard to GES construction, occurs due to the considerable fluctuations in the water level caused by the irregular operation of the GES over the course of days and weeks. On sections of the river below a hydraulic development, especially at its head, the fluctuations in the water level reach considerable amounts. The passage of large vessels through the Gorkiy lock, for example, can only take place during GES peak-load hours. The rest of the time, a drop

in water level occurs and the fleet must stand for a long period.

An analogous situation has been observed at other hydraulic developments as well. Thus, on the Kama, with the adopted planned release of the Votkinsk GES it seems impossible to ensure a guaranteed depth for the Volga in this region. This limits the carrying capacity of the vessels using it for shipping on interbasin routings.

In a number of cases, the traffic capacity of the Unified Deepwater System is limited to a greater or lesser extent by the traffic capacity of the existing locks. The utilization of many of the locks is such that it causes additional standing time for the fleet while awaiting passage through the lock, and therefore a further growth of freight turnover requires the strengthening of their traffic capacity. Another bottleneck on water routes is bottom limitations for approach canals and shallow approaches to a number of locks. This is associated with the fact that at practically all hydraulic developments with freestanding downstream pools, a reduction in water level has occurred compared to the planned depth.

The expediency of utilizing combined routings when necessary for relieving railroads is undisputed. The switching of freight from direct rail routings to combined ones is considered a natural phenomenon by certain scientists and practical workers. There are, however, a number of difficulties here.

In the replacement of direct rail routings with combined ones with a single transloading, there exists the complete relief of those rail routes that are freed from participation in the shipping. If a combined routing with two transloadings is used instead of a direct rail one, the difficulties in rail transport are not eliminated and, conversely, new ones are substituted. Freight traffic on combined routings with two transloadings reduces the freight load on individual rail routes, but at the same time increases the number of central stations occupied in handling it and the amount of freight handled. This additional utilization limits the traffic capacity not only of the central stations, but of the sidings attached to them.

In this regard, it is essential to take into account that in the majority of cases today, the stations are more of a bottleneck in rail-transport operations. Decreasing the run distance of loaded cars and, correspondingly, the need for them on certain railroads, freight traffic on combined routings with two transloadings simultaneously increases the empty run distance, as well as the need for cars on other railroads. Consequently, placing before river transport the task of relieving the railroads on sections with parallel operations is fully justified only with regard to combined shipments with one transloading.

The sphere of expedient application of river transport for shipping dry bulk freight on combined routings, determined by the economy of shipping (by cost), is limited. Table 1 presents data on the average cost (in percentages) of shipping by rail and river transport.



Type of Transport	-----Average shipping cost, %-----						
	1960	1970	1980	1981	1982	1983	1984
Rail	100.0	100.0	100.0	100.0	100.0	100.0	100.0
River	133.0	128.3	105.5	106.8	105.6	106.1	112.8

In evaluating the comparative economy of freight shipping by railroad and river routes, it is essential to take into account that the cost of river shipping does not include expenses for the upkeep of waterways. Taking these expenses into account, according to the calculations of TsNIIIEVT, the cost of river shipping increases an average of 13 percent. This means that the economy of rail shipping is higher than river shipping by an average of 19-25 percent. Only on the Volga Mainline is the cost of shipping less, by 1.3-1.6 times, than for the corresponding railroads. It currently has less than 25 percent, however, of all freight shipping by river transport. In the shipping of dry bulk freight, the Volga Mainline has a share of less than 30 percent. For other river basins, it basically considerably exceeds that of railroads.

The data on the shipping cost comparisons for dry bulk freight on individual railroads and the corresponding river shipping companies (taking into account expenses for waterways as a percentage of the cost of river shipping) are presented in Table 2.

Table 2

Name of transport enterprise	-----Average cost, %-----			
	-----1980-----		-----1984-----	
	by ship	by rail	by ship	by rail
Volga United River Shipping Co.	100.0		100.0	
Volga Railroad		161.0		156.0
Kuybyshev Railroad		135.5		126.1
Gorkiy Railroad		136.0		129.7
Northern Railroad		158.5		144.7
Kama River Shipping Company	100.0		100.0	
Sverdlovsk Railroad		112.9		92.2
Gorkiy Railroad		85.5		77.0
South Urals Railroad		78.1		66.5
Kuybyshev Railroad		89.1		74.9
Volga-Don River Shipping Co.	100.0		100.0	
Volga Railroad		70.2		67.3
Donetsk Railroad		87.1		83.4
Southeastern Railroad		67.9		62.7
Northwestern River Shipping Co.	100.0		100.0	
October Railroad		74.2		73.9

An analysis of Table 2 shows that with the decreasing share of the Volga Basin in interbasin routings, the average cost of shipping approximates its value for railroads. With the achievement of a certain value, different for individual shipping connections depending on the water basins participating, the average cost of interbasin shipping will be equal to that of railroads (in direct routings), and with a further decline in the share of the Volga Basin, it will change in favor of the railroads.

Notwithstanding the great influence of the cost level of river shipping on the sphere of economically expedient application of river transport, it is, as a rule, not considered a cause of the inadequate development of freight shipping on combined routings. Moreover, there exists scientific research in which the trend toward an increase in the cost of shipping by river transport is evaluated groundlessly. Moreover, according to the opinion of certain river-transport specialists, this growth cannot prove the inadequate efficiency of river shipping.

The trend toward an increase in the cost of river shipping today is decisive in an evaluation of the efficiency of combined rail and river shipping and should be taken into account in technical and economic calculations. After all, the comparatively higher cost of river shipping compared to railroads is one of the principal factors that restrains its development. This is explained by the fact that cost serves as the basis for establishing a value for the transit charges for shipping and that its level actually achieved depends on the degree of efficiency of transport operations.

Research carried out at VNIIZhT and the IKTP [Institute of Integrated Transportation Problems] of USSR Gosplan has established that the majority of combined shipments with two transloadings are unprofitable for railroads (income does not cover expenses), and slightly profitable for river transport (profit after expenses on the average is no more than 10 percent). In all cases where the cooperation of the shipping activity of rail and river transport is insufficiently economical for the partners, or even unprofitable, it cannot (according to this indicator) be deemed expedient for the unified transportation network or the national economy overall. The receipt of negative economic results is possible for two reasons: when the tariffs for the shipping of freight in combined routings are set lower than the level of necessary expenditures for carrying it out, and where the inexpensive shipping (by cost) is partially replaced with comparatively more expensive shipping.

In order to improve economic results in the cooperative operation of rail and river transport, incentives for inefficient shipping in combined routings should be refrained from in accordance with the requirements for its development in economically expedient areas. The existing system of tariffs for freight shipments on combined rail and water routings do not provide for the resolution of this task and are therefore in need of improvement. It is essential to make a decisive transition from artificial incentives for shipping to a raising of its efficiency for the further development of combined shipping on economically expedient connections.

Таблица 3

(1) Род груза и корреспонденции перевозок	(2) Пункты перевалки	Увеличение показателей в смешанном сообщении по сравнению с прямым железнодорожным						
		(3)						
		(4) расстояние перевозки, км	(5) эксплуатационных расходов, руб/т	(6) сроков доставки грузов, сут	(7) на 100 тыс. т перевезенного груза			
					(8) транспортной работы, млн. т·км	(9) потерь груза, т	(10) контингента работников	(11) подвижного состава, тонн (12) тоннажа вагонов и судов единицы вагонов
(13) Каменный уголь								
(14) Кемерово—Яничкино	Тольятти, Москва (Южный порт) (25)	1140	2,53	15	114,0	2300	35	5 900 13
(15) Кемерово—Яничкино	Пермь, Москва (Южный порт) (26)	1171	1,93	18	117,1	2300	29	11 400 24
(16) Кемерово—Ленинград	Ульяновск, Ленинград (27)	1074	1,16	16	107,4	2300	32	3 800 —
(17) Кемерово—Ленинград	Левшино, Ленинград (28)	1327	1,01	18	132,7	2300	16	11 400 10
(18) Караганда—Доля	Куйбышев, Усть-Донецк (29)	188	1,12	9	18,8	2300	17	8 700 26
(19) Лес								
(20) Тюмень—Ясиноватая	Пермь—Усть-Донецк (30)	838	2,29	18	83,8	—	77	14 700 35
(21) Руда								
(22) Оленья—Магнитогорск	Медвежьегорск—Пермь (31)	1254	0,40	18	125,4	3200	7	13 700 40
(23) Кварциты								
(24) Овруч—Никополь	Мозырь, Запорожье (32)	222	0,60	3	22,2	2450	18	3 300 19

Key: 1--Type of freight and shipping connections; 2--transloading points; 3--increase in indicators on combined routings compared to direct rail; 4--shipping distance, km; 5--operating expenses, rubles; 6--freight delivery times, days; 7--per 100,000 tons of freight shipped; 8--transport operations, millions of ton-km; 9--freight loss, tons; 10--personnel contingent; 11--rolling stock, tons, tonnage of railcars and vessels; 12--railcar units;

13--Coal  
14--Kemerovo--Yanichkino  
15--Kemerovo--Yanichkino  
16--Kemerovo--Leningrad  
17--Kemerovo--Leningrad  
18--Karaganda--Dolya  
19--Timber  
20--Tyumen--Yasinovataya  
21--Ores  
22--Olenya--Magnitogorsk  
23--Quartzite  
24--Ovruch--Nikopol

25--Togliatti, Moscow (South Port)  
26--Perm, Moscow (South Port)  
27--Ulyanovsk, Leningrad  
28--Levshino, Leningrad  
29--Kuybyshev, Ust-Donetsk  
30--Perm--Ust-Donetsk  
31--Medvezhyegorsk--Perm  
32--Mozyr, Zaporozhye

The comparative efficiency of shipping by direct or combined routings is determined not only by the ratio of the cost levels of river and rail shipping, but also by the freight delivery times as well as the magnitude of freight losses in the transporting process. Without a substantial improvement in these economic indicators for river transport, the prospects for growth in combined shipping remain limited. It has been established that currently, combined shipping with two transloadings, according to economic evidence, is considerably inferior to shipping by direct rail routing. Table 3 presents data on the magnitude of additional expenditures for the national economy.

Shipping volume on combined rail and river routings with two transloadings currently totals approximately 12 million tons. For example, more than 760,000 tons of Kuznetsk coal intended for Leningrad is shipped each year. For carrying out these shipments alone, the additional transport work totals more than 800 million ton-kilometers. Operating expenses are almost 900,000 rubles greater than those for direct rail shipping. Freight losses in the delivery process increase by almost 24,000 tons.

Furthermore, the shipping of freight in combined routings with two transloadings causes additional losses for the working car fleet with regard to damage in transloading operations. According to rough calculations, approximately 40,000 cars are damaged in freight shipping by combined routings with two transloadings in river ports each year. This quantity of cars could ship an additional 450,000 tons of various freight.

Thus, the transfer of economically inexpedient connections with combined routings with two transloadings to direct rail routings would provide a considerable economy of labor and material resources and will create opportunities for increasing the volume of freight shipping in rail and river transport.

It must be noted that the development of freight shipping by combined routings on economically expedient connections is hindered by a narrow range of products and the associated narrow specialization of the river fleet. Thus, approximately 80 percent of all shipments are coal, mineral and construction freight and ores. The narrow specialization of the river fleet, intended basically for the shipment of bulk freight, hinders an increase in the share of river transport for the shipment of, for example, motor-vehicle equipment, paper, vegetables, container freight and others. The positive feature of such specialization was that it facilitated the rapid and considerable development of raw-materials shipping, but at the same time it substantially restrained the development of the shipping of other freight for the national economy.

Under modern conditions, the narrow specialization of the river fleet, as well as the disparity of the directions of river transport mainlines with the geography of the principal traffic flow of mass raw material freight, led to the fact that with the availability of freight for the national economy attracted to water routings, river transport cannot take the necessary part in shipping it. As a result, on certain routes, especially where the transfer of shipments by combined routings with two transloadings to the more

economical direct rail routing is carried out, river transport feels the shortage of freight even more, which has a negative effect of the utilization efficiency of its fixed productive capital and manpower. All of this limits the sphere of expedient application of river transport in combination with rail transport.

The shortcomings noted in the specialization of river transport could be eliminated by taking into account the pattern of freight traffic following railroads on routes parallel to waterways, as well as its advantageous utilization in direct water and combined rail and river routings with one transloading on economically expedient routes.

The Fundamental Areas of Economic and Social Development of the USSR for 1986-1990 and for the Period to the Year 2000 envisage a most rapid rate of freight shipment growth on the rivers of Siberia, the Far East and on shallow rivers. Taking into account the inadequate development of the railroad network in the eastern regions of the country, the discussion in this case concerns the advantageous development first and foremost of direct water and combined rail and water shipments with one transloading. As for the European part of the country, there exists the possibility of relieving the railroads during the navigable period by transferring certain freights (motor vehicles, paper, apatite, mineral fertilizers, salt etc.) first and foremost to direct water routings without the participation of rail transport. Currently, however, the implementation of these measures is restrained not only by the noted narrow specialization of the river fleet, but also by the inadequate development of the berths of freight shippers and recipients and the policy of distributing capital investment among river transport and the industrial sectors of the national economy.

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## INTERSECTOR NETWORK DEVELOPMENT

### GOSPLAN'S BIRYUKOV ON RIVER-RAIL TRANSSHIPPING COORDINATION

Moscow VODNYI TRANSPORT in Russian 10 Jul 86 p 2

[Article under the rubric "Responses to VODNYI TRANSPORT": "Relapses of Hydrophobia"]

[Text] That was the title of an article published in our newspaper on January 30 of this year. It raised the issue of shortcomings in the planning and organization of combined rail shipping, the poor utilization of the transshipment capacities of a number of ports, and disproportions in the development of staging centers.

The editors have received a response from USSR Gosplan Deputy Chairman V. Biryukov. It reports that USSR Gosplan, having reviewed the article "Relapses of Hydrophobia," notes that over the last 10-15 years the territorial disposition of production and the requirements for certain types of products have changed substantially, as has the rational scheme for the delivery of specific freight. The delivery of Donetsk coal to the European part of the USSR in particular has decreased, and the demand for Kuznetsk coal has declined. This has led to a decrease in the amount of combined shipping.

The correlation of the economic indicators of railroad and river transport, which have a substantial effect in calculations for the choice of type of transport, have changed considerably, not to the benefit of the latter, first of all due to the sharp increase in the cost of the transport fleet. The construction cost of freighters has more than doubled in 20 years. The insufficient attention of ministries and departments toward the construction of industrial berths and underestimations in the organization of these shipments by the enterprises of river and rail transport also restrain the development of combined shipping.

Combined shipments with two transshipment operations, to which the authors of the article direct attention, have an extremely limited sphere of application and, according to calculations of the Institute of Integrated Transport Problems, can be economically expedient with a reduction in the railroad run distance of no less than a thousand kilometers.

The decision to increase or decrease freight shipping on combined rail and water routes is made in each specific instance, based on their efficiency compared to shipping by direct rail routes. The Interdepartmental Commission on the Rationalization of Freight Shipping of USSR Gosplan, along with ministries, departments and their institutes and the Institute of Integrated Transport Problems, periodically reviews issues associated with the shipping of freight on combined routes, and its resolutions are the foundation for the development of the shipping plan for that type of route. Continuous monitoring of the realization of the decisions adopted is established.

Shortcomings in the existing system of planning freight transshipment from one type of transport to another are presented quite objectively in the article, the reply to the editors notes. Improving the interaction of various types of transport is one of the most important problems in the national economy. A new system is currently being worked out for the relationships among the participants in the transport process, and the methods of coordinating operations in the development of automated systems for planning calculations are being improved. MPS [Ministry of Railways], Minmorflot [Ministry of the Maritime Fleet], RSFSR Minrechflot [Ministry of the River Fleet] and RSFSR Minavtotrans [Ministry of Motor Transport] are developing proposals for the integrated planning of the operations of transport centers. The Institute of Integrated Transport Problems of USSR Gosplan has been entrusted with summarizing the indicated proposals of the transport ministries and presenting a draft statute on the integrated planning of transport-center operation to the USSR Gosplan Transport Department.

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